For producers of Sand and Gravel, Crushed Stone, Cement, Lime, Gypsum, and other nonmetallic minerals

JUNE 1957

PIT and QUARRY

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Silica Sand Pit of Mid-Continent Glass Sand Co. at Roff, Okla. (See Page 2)

THE MAJOR DIFFERENCE BETWEEN WOVEN WIRE SCREENS IS THE SERVICE THEY GIVE.

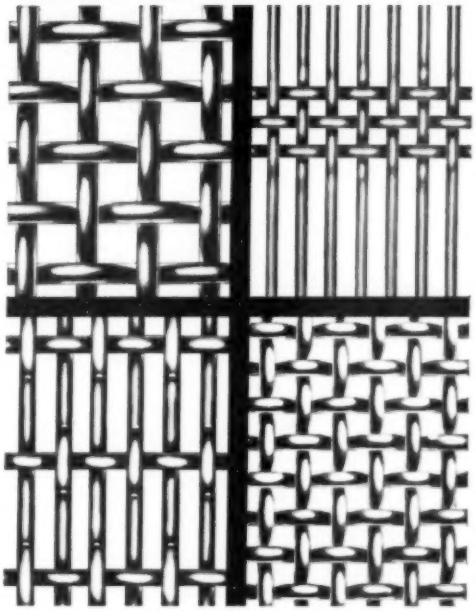
Ludlow-Saylor
Super-Loy
WOVEN WIRE SCREENS

L-S Screens are tougher, stronger, more rigid —are put together with greater precision. They wear longer. Screen openings stay accurate. Edges are more carefully finished. They won't break down from fatigue or continual vibration. All this *pays off* in less downtime and replacement expense, better product uniformity, higher output.

An on-the-job test will prove L-S Screens are worth more but actually cost less because of the service they give.

***Immediate Shipment** of most weaves and sizes*

Write For Condensed Screen Reference Catalog



L-S special-purpose industrial wire cloth and screens are woven on Ludlow-Saylor looms of stainless, monel, bronze, copper, brass, oil-tempered, high-carbon, or any other wire.

SINCE 1856

LUDLOW-SAYLOR WIRE CLOTH CO.
601 South Newstead Ave. • St. Louis 10, Mo.

SALES OFFICES: Birmingham, 1727 Sixth Ave., North; Chicago, 5708 W. Diversey; Pittsburgh, Union Trust Building; Houston, 1213 Capitol Ave.; Denver, 1530 Carr St.
WEST COAST: Star Wire Screen and Iron Works, Inc., 2515 San Fernando Road; Los Angeles, Subsidiary, Ludlow-Saylor Wire Cloth Co.

Now! It's

LINK-BELT

PRE-BILT

sectional belt conveyors

for

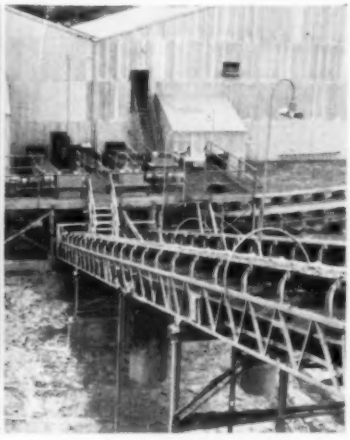
Link-Belt conveyors efficiently stock and reclaim four sizes of sand and gravel at one of the industry's most modern yards.

EASY SELECTION... QUICK DELIVERY

Order from nearest of 9 plants—reduce costs and delays

HERE'S today's top answer to efficient, economical, long-life bulk handling — Link-Belt PRE-BILT sectional belt conveyors. They combine standard products, sectional truss frames and supporting bents to meet your exact requirements. Let a Link-Belt representative help you choose from 27 standard, packaged components — with drives up to 40 hp . . . 18, 24, 30 and 36-in. belt widths . . . 24 and 42-in. truss depths. For the full story, call your nearest Link-Belt office.

Inclines like this pose no special problems for highly-adaptable Link-Belt PRE-BILT sectional belt conveyors.



Conveyor with 30-in. wide belt handles iron ore concentrate and tailings from washing plant to loading hoppers.

Book 2579 outlines Link-Belt PRE-BILT sectional belt conveyor advantages. Write for your copy today.

FROM SELECTION TO OPERATION...AS SIMPLE AS THIS

EASY SELECTION. Your Link-Belt representative will help you select the best combination of PRE-BILT sectional belt conveyor components.

PROMPT QUOTATIONS. He will prepare a comprehensive and accurate estimate of requirements for installations that permit "on-the-ground" survey.

SIMPLIFIED PURCHASE. Parts are standardized, interchangeable, all available from one supplier. Link-Belt representative can furnish all necessary data.

QUICK DELIVERY. PRE-BILT conveyors are built at nine strategic locations and are shipped from the plant nearest you.

FAST INSTALLATION. Can be readily handled by your own erectors in most cases. Link-Belt can also furnish complete erection service and supervision.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

14.113

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pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

JUNE 1957 Vol. 49 No. 12

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Cover Picture

• A tractor is shown cleaning up in the silica sand pit (or quarry) of the Mid-Continent Glass Sand Company at Roff, Okla. The deposit is an unusual formation, and unusual procedures are required to recover the material. First 13 ft. of overburden is removed by a scraper. Then a 3-ft. layer of rock under the overburden is drilled and blasted in order to reach the 40-ft. deep deposit of fine silica sand. The sand is hydraulicked away, and the pieces of rock fall to the pit floor. They are moved out of the way by the tractor-bulldozer.

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other nonmetallic minerals.

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PIT AND QUARRY magazine was founded by H. W. Baumgartner, October, 1916.

To subscribers: When requesting change of address, kindly send old as well as new address.

...AND QUARRY IS INDEXED ...GINEERING INDEX

DENVER QUARRY PIT PLANT EQUIPMENT

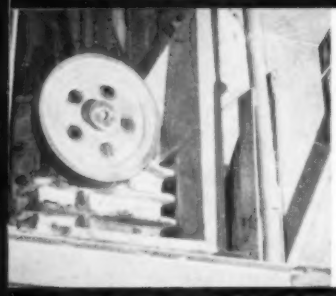
BALL-ROD MILLS

Distinctive Features

Electric cast and annealed steel heads reinforced with heavy ribs give greater strength than the usual cast iron. Trunnions are machined to true with axis of mill. Over-size trunnion bearings are lined with high grade babbitt and sealed to give lowest possible bearing pressure, with less wear and longer service. Liners for heads and shell available in the variety of long-wearing alloys. Trunnions can be furnished with small (standard), medium or large diameter openings. Greater capacity because diameter is measured inside new liners compared to other mills where diameter is inside shell. Discharge types are available: end peripheral, center discharge peripheral overflow, perforated overflow, return spiral and grate.

Size Ft. Dia. x L.	Capacity Tons/Hr.	Ave. Motor HP	DIMENSIONS L	W	H	Approx. Ship. Wt. Lbs.
4'x5'	1.28-2.62	30	14'-10"	8'-0"	6'-7"	18,450
4'x6'	1.54-3.08	40	15'-10"	8'-3"	6'-7"	20,500
4'x10'	2.58-4.84	50	19'-10"	8'-3"	6'-7"	28,200
5'x6'	2.78-5.42	60	17'-0"	10'-2"	7'-9"	31,200
5'x8'	3.75-7.08	75	19'-0"	10'-2"	7'-9"	36,000
5'x10'	5.42-8.75	100	21'-0"	10'-2"	7'-9"	42,000
5'x12'	5.65-10.1	125	23'-0"	10'-2"	7'-9"	47,800
6'x6'	5.15-10.8	125	18'-2"	12'-8"	10'-4"	49,300
6'x8'	6.38-13.6	150	20'-2"	12'-8"	10'-4"	56 300
6'x10'	7.70-16.2	175	22'-2"	12'-8"	10'-4"	62,300
6'x12'	8.95-19.4	200	24'-2"	12'-8"	10'-4"	69,500
7'x12'	14.6-40.0	350	26'-5¼"	13'-10¼"	11'-4"	96,500
7'x14'	16.2-44.8	400	28'-5¼"	13'-10¼"	11'-4"	103,000
8'x6'	12.4-33.4	250	22'-5¼"	15'-2¼"	12'-4"	95,000
8'x10'	19.0-52.3	350	26'-5¼"	15'-2¼"	12'-4"	125,000
8'x14'	24.2-67.0	450	30'-5¼"	15'-2¼"	12'-4"	145,000

JAW CRUSHERS

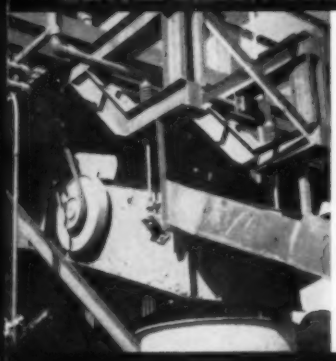


Distinctive Features

A forced-feed crusher with anti-friction pitman and side bearings. Cast steel frame on 10"x20" and smaller, welded steel frame on larger sizes. Jaw plates can be inverted for longer wear. Highest capacity is assured by extra long jaws with greater crushing area and by forced feed operation. Uniform product size range is maintained by the jaw opening, which can be easily set for the size desired.

Crusher Size	H.P. Motor	RPM Motor	Dimensions (In.) L	W	H	Approx. Ship. Wt. Lbs.
5x6	5	325-375	28	27	25	900
8x10	10	250-325	45	42	39	2,600
10x16	30	250-300	56	61	44	5,600
10x20	30	225-275	55	66	50	7,000
15x24	50	225-275	59	72½	71	13,000
18x24	50	225-275	59	72½	71	13,000
15x36	60	200-250	60	89⅛	75	19,200
18x36	60	200-250	60	89⅛	75	19,200
21x36	75	200-225	66	89⅛	86½	23,450
25x40	100	200-225	82	94½	102	35,000
32x40	100	200-225	84	96½	113½	45,000
36x48	200	200-225	115	114½	134	92,000

DENVER-DILLON SCREENS



Distinctive Features

Operate on a special, patented two bearing system. Flywheel weights counter balance the eccentric shaft, giving a "true circle" motion to the screen. Spring suspensions carry the weight. Bearings support only weight of shaft. This leaves the screen free to "float" and follow the positive screening motion without power consuming friction losses. The horsepower savings (up to 50% over 4-bearing screen) of these screens is a big item.

Screen Size W x L	With Overhead Suspension Frame Width	Length	Height	Approx. Ship. Wt. Lbs.*	Motor HP
1'x3'	3'-2¼"	2'-1⅞"	3'-8"	340	½
1'x4'	4'-1⅛"	2'-1⅞"	4'-05⅛"	400	¾
1½'x3'	3'-2¼"	2'-7⅞"	3'-8"	395	¾
1½'x4'	4'-1⅛"	2'-7⅞"	4'-05⅛"	480	¾
1½'x6'	5'-11⅞"	2'-7⅞"	4'-97⅛"	600	1
2'x4'	4'-25⅛"	3'-4"	4'-107⅛"	580	1
2'x6'	6'-0⅛"	3'-4"	5'-115⅛"	1500	2
3'x6'	6'-0⅛"	4'-4"	5'-115⅛"	1650	3
3'x8'	7'-11⅞"	4'-4"	6'-95⅛"	2100	3
3'x10'	9'-9⅞"	4'-4"	7'-75⅛"	2520	3
4'x8'	8'-0"	5'-5⅛"	7'-101⅛"	2320	5
4'-10'	9'-10⅛"	5'-5⅛"	8'-73⅛"	2860	5
4'x12'	11'-8¼"	5'-5⅛"	9'-45⅛"	4100	5
5'x10'	9'-10⅛"	6'-5⅛"	8'-73⅛"	4400	7½
5'x12'	11'-8¼"	6'-5⅛"	9'-45⅛"	4750	7½
5'x14'	13'-6⅜"	6'-5⅛"	10'-17⅛"	5480	7½

*With suspension framework only.

SRL SAND PUMP

Distinctive Features

Specially bonded molded-rubber-on-steel parts give the Denver SRL Sand Pump greater efficiency in handling abrasive pulps, and increases parts life, as much as 15 times longer than that of hard iron parts. Pump design and hydraulic efficiency produce up to 40% decreased horse power consumption compared to equivalent all metal pump. Available with mechanical shaft seals or with sealing water. Pumps and parts in stock. Denver SRL's as vertical sump pumps are also available.

Pump Size and Type	CAPACITY 20' Head RPM	HP	Water AV. GPM	DIMENSIONS (In.) L	W	H	Motor HP	Approx. Ship. Wt. Lbs.
2"x2"	838	0.6	50	25½	17½	26⅜	1-10	575
3"-3"	760	1.1	100	31¼	19¾	31½	1½-25	850
5"x5"	590	2.4	300	37¾	26¼	36½	2-50	1550
6"x6"	.....	.....	.....	45¼	28½	46½	5-100	2300
3"x3"—C	870	1.5	150	37½	21½	33¾	1-20	1240
5"x4"—C	655	2.9	350	40¼	27	37⅜	2-40	1600
8"x6"—C	500	5.7	800	63	36½	49¼	5-100	4375
10"x8"—C	485	14.0	2000	68¾	43	57	10-125	5100

*Based on water. Multiply listed horsepower by specific gravity of pulp to obtain actual brake horsepower.

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The firm that makes its friends happier, healthier and wealthier

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Advanced Technology
demands
Advanced Lubricants

and from

LUBRICATION ENGINEERS, INC.

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509

and

510

THE FINEST MULTI-PURPOSE GEAR LUBRICANTS AVAILABLE ANYWHERE!

To Keep Pace With—

- ...new gear designs
- ...greater tooth pressures
- ...higher torque values
- ...longer, more tortuous work schedules

LE 509-510 Offer—

- ...high viscosity index
- ...extremely high flash point
- ...performance **TESTED AND PROVEN** to withstand the heavy pressure and loads imposed on modern differential gears.

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FORT WORTH, TEXAS
Industrial Lubricants for Industrial Equipment

pit and quarry

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A REPEAT ORDER FOR WISSOTA Sand & Gravel Co. Eau Claire, Wisc.

When you have a Real Rock Shovel—you'll always be sure of output in any digging!

Look at that dipper—a heap every time! Sure, any machine can dig this stuff but there is more to it than that. Smooth control, accurate spotting, jerk-free, grab-free swing combined with the Northwest Dual Independent Crowd really pours out the material. There are no slow downs or delays in a Northwest digging cycle and it means a total of many more loads at the day's end.

This big, Model 6, 1½ cu. yd. Northwest is in the pits of the Wissota Sand & Gravel Co. of Eau Claire, Wisconsin. This is the third Northwest this company has purchased—a repeat order that beyond all question endorses Northwest performance and output.

Northwests are built for the toughest job a shovel has to do. They mean high output in any class of digging. Get the full story on Northwest advantages and remember, one out of every three Northwests sold is a repeat order.

S6-11-SG

NORTHWEST ENGINEERING CO.
135 So. La Salle St. Chicago, Illinois

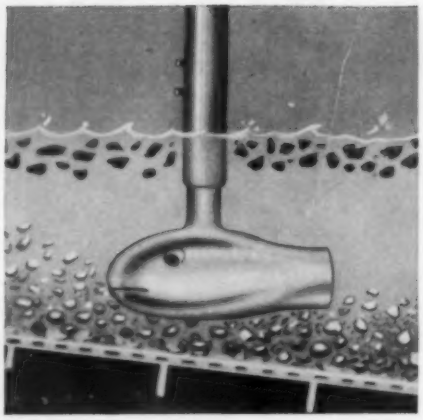
NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

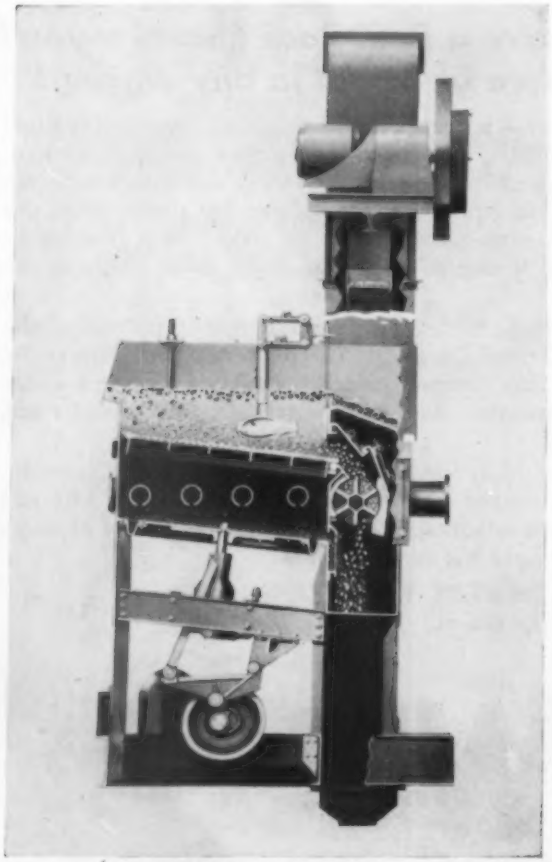
Convertible for any Mining Material Handling or Excavation Problem

Jigging stratifies materials according to specific gravity, separating solids in upward and downward pulsations of water. The heavier materials settle to the screen plate and are drawn off. The lighter materials overflow.

Jigging is a universal separating process for materials ranging from the specific gravity of gold at 19 to coal at 1.3. Proportions of high gravity materials may vary from 90% to 10% or less. It is applicable to any separating problem where there are even small differences in specific gravity.



a low-cost method of cleaning your sand and gravel...



Cross Section of Jeffrey Heavy-Duty Sand-and-Gravel Jig.

• You can increase your production and profits with a Jeffrey sand-and-gravel jig. Materials as quarried are fed to the jig. Coal, shale, clay, roots and sticks are removed, leaving sand and gravel of marketable grade. Capacities up to 75 tons per hour.

Jeffrey jigs have been used successfully for many years. Jeffrey engineers are fully qualified to advise you on sand-and-gravel problems.

Bulletin 892 describes Jeffrey sand-and-gravel jigs and gives data useful to men who are laying out a plant. For a copy, write to The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

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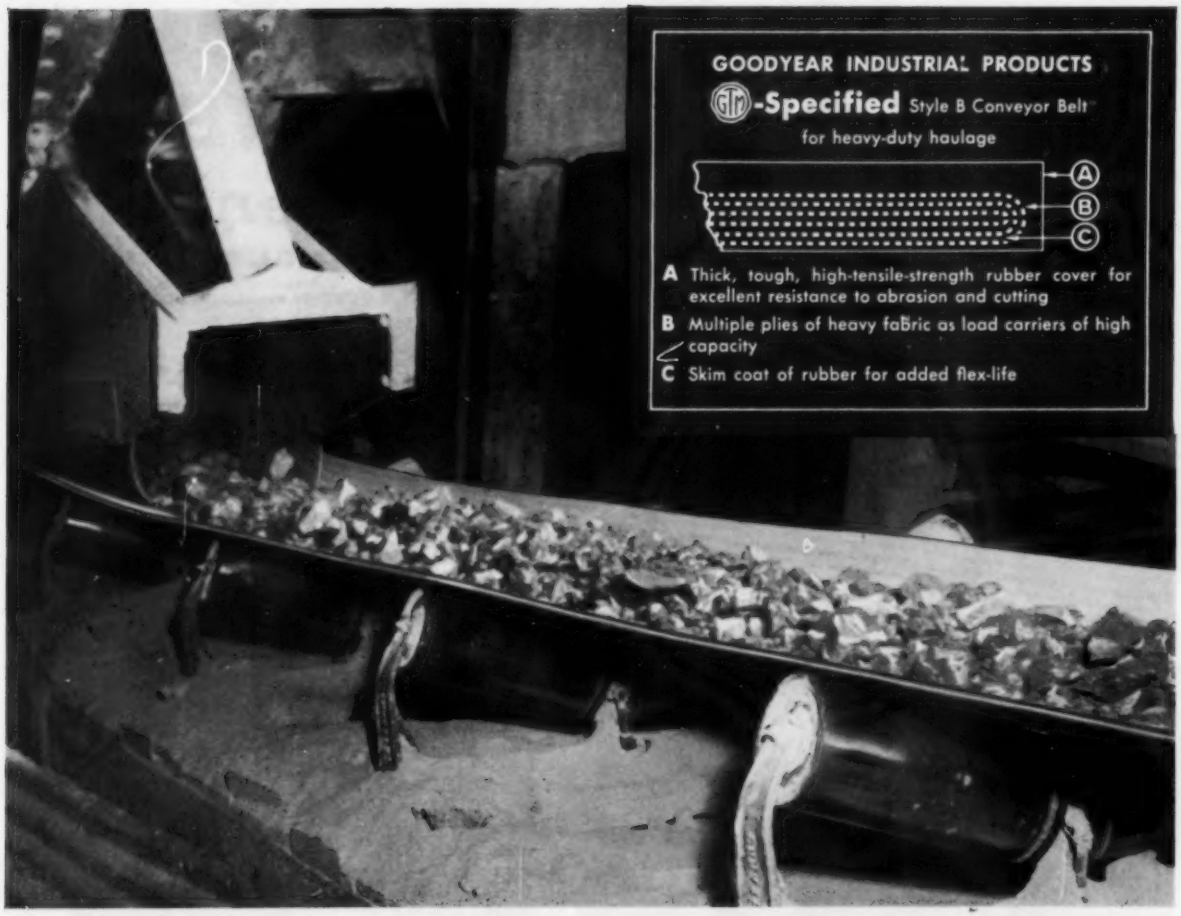

GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified Style B Conveyor Belt
for heavy-duty haulage
A
B
C
A Thick, tough, high-tensile-strength rubber cover for excellent resistance to abrasion and cutting
B Multiple plies of heavy fabric as load carriers of high capacity
C Skim coat of rubber for added flex-life

Twice the life on rugged rock-moving job

HOISTING raw rock – ton after ton, day after day – was murder on previous conveyor belts used at this Midwestern cement plant. Even the longest-lived belt barely made it to the 25-month mark. Repair and replacements meant mounting down time and reinstallation expenses.

So there was a lot of hopeful expectation when the G.T.M.–Goodyear Technical Man–made his recommendation. It was for tough Goodyear Style B Belt – sinewed with heavy, multiple-ply fabric for exceptional load-carrying capacity.

Result: *the G.T.M.'s belt handled the job more than four full years–brought substantial savings to the user.*

There's nothing unusual in this case history, either. All over the country, the Goodyear Technical Man is saving important time and money – wherever the job calls for industrial rubber products. To cash in yourself, contact him through your Goodyear Distributor – or by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

CONVEYOR BELTS by

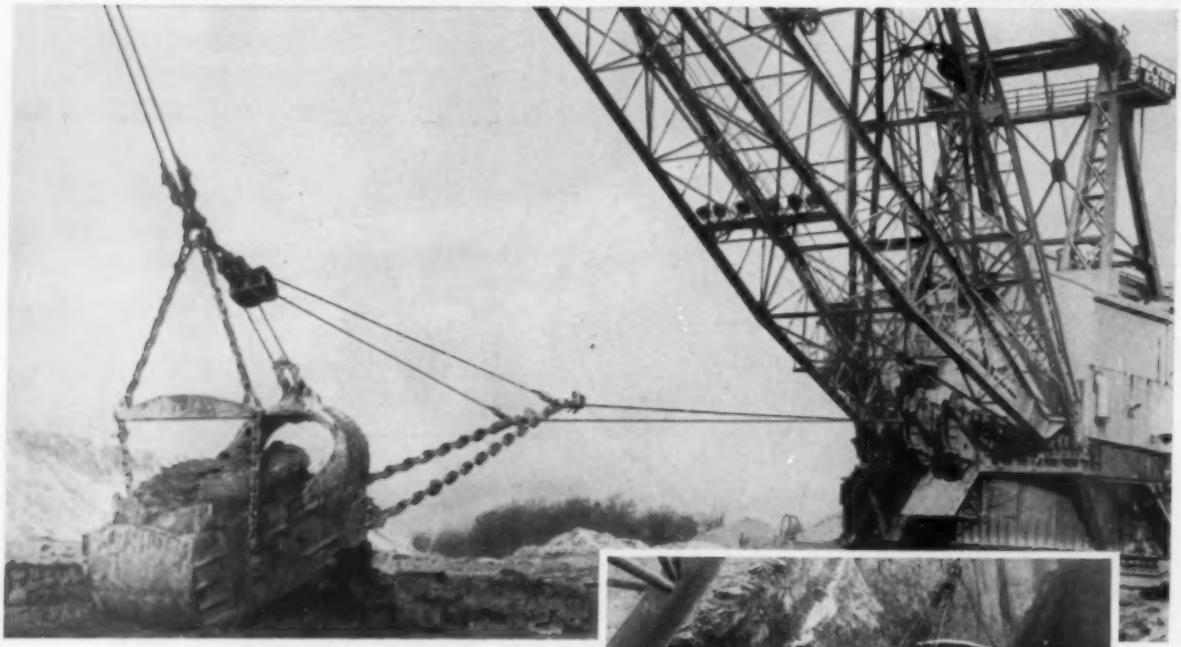
GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

"Page is the BEST DIGGING BUCKET I've ever seen"

...ANGUS BAIN
FAIRVIEW COLLIERIES,
DANVILLE, ILLINOIS



30 yd. Page Automatic digging to depths up to 100 ft. gets maximum loads each cycle.

There's No Substitute for DIGGING ABILITY in a Dragline Bucket

Experienced dragline men like Angus Bain of Danville's big Fairview Collieries, know that the only way to judge a dragline bucket is by its *digging ability*. Digging ability means faster loading of maximum loads, more cycles per hour and greater production per shift — the real payoff of dragline equipment.

Page Automatic Buckets lead the field and are the choice of production-conscious buyers because they have the built-in automatic action that makes them start digging sooner, fill faster and carry out more yardage than any other bucket.

Page Automatic Buckets have often been imitated, but their most important feature — *digging ability* — has never been equalled. You can improve the productive capacity of any machine by putting it to work with a Page Automatic... the bucket that's built to dig better.

Want proof? We can arrange a demonstration of a Page Automatic on your own machine. You be the judge of its digging ability and performance. Write for details today. There's no obligation.

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CLEARING P.O. • CHICAGO 38, ILLINOIS

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Automatic Dragline Buckets
Walking Draglines

If it's a PAGE... *It* DIGS

B-3110

Higher Tonnage at Lower Cost with . . .

BECAUSE OF .

- SIMPLICITY OF DESIGN

Compact—no belts or pulleys

- ELECTROMAGNETIC DRIVE

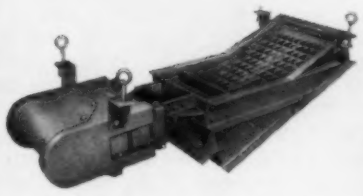
Continuous, trouble-free operation.

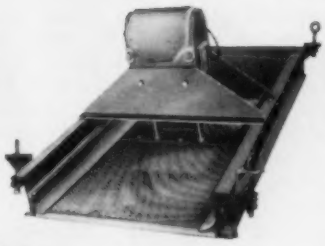
- VARIABILITY OF FEED RATE

Instantly controllable feed rate —from minimum to maximum

SYNTRON **Electromagnetic**

VIBRATING SCREENS





DOUBLE SERVICE — both feed and screen

These heavy duty SYNTRON Vibrating Screens are designed for durable service—both feed and screen in one operation. Feeding coarse materials to hammer mills, crushers, etc., at the same time screening out the fines to prevent clogging of operations. Constructed to withstand abuse of impact loads of stone or heavy rock day after day, without noticeable damage. SYNTRON Electromagnetic Vibrating Screens with controlled feed rate deliver higher output with more effective separation. Designed and built for easy, low cost maintenance, long dependable trouble-free service.

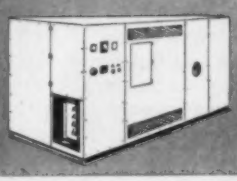
SYNTRON'S years of experience are available to you—write to our application engineers giving details of your screening problems.

Model F-55 Grizzly Discharge Feeder padding the belt with fine to protect it from rock.

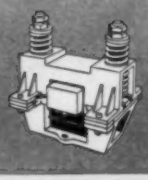
Builders of quality Equipment for more than a Quarter-Century

Other SYNTRON Equipment of proven Dependable Quality

AC TO DC POWER CONVERSION UNITS

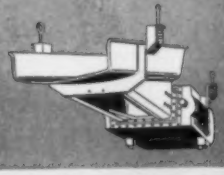


BIN VIBRATORS



GASOLINE HAMMER ROCK DRILLS

VIBRATORY FEEDERS



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385 Carson Avenue Homer City, Penna.

The Editor's Page

Research and Progress

INDUSTRIAL research has become one of the nation's largest businesses, amounting to 1½ percent of the gross national product, it was pointed out at the recent National Industrial Research Conference, and it is growing at the rate of about 12 percent a year. Since 1930 research has grown from a $300 million activity to a $6 billion industry employing over 500,000 people. It has also grown into a new relationship with industry, to a point where it is now an integral part of a company's operations and an important factor in its competitive strength.

Research on the many products of the nonmetallic minerals industries and their related fields, including concrete, is being carried on in many places—by individual companies, by their trade associations, by colleges and universities through fellowships or grants, and by various governmental bodies. This is all very well, and the results have often been impressive, but the sum total leaves these industries far behind the parade. By any comparison, the amount of research done in, by, and for this field is far below the national average, and many of these industries individually lag dangerously far behind their competitive industries in this respect.

What these industries need is not only more research but also better planning and distribution of it. Research by individual companies in this field has achieved some remarkable results, repaying expenditures many times over. Usually, however, it has been applied research aimed at the company's special problems, and in most cases it has benefitted only these companies—large producers operating numerous plants—giving them still another competitive advantage over the smaller producers who cannot afford the expensive staffs and laboratories.

THE research done by various governmental agencies, chiefly national, has been very important to these industries and without it many of them could not have reached their present stature. Governmental research, however, has necessarily been aimed primarily at the location and development of our national resources, especially those important to our economy and security.

It seems obvious that the smaller producing companies must depend, for research beyond the scope of any made available to them from other sources, on their national trade associations, on their state universities through grants or fellowships, or on the small but growing number of research foundations which do such work at nominal cost.

Of these, the trade associations have done the best job and are by their very nature best fitted to serve these industries. Many of these associations have been handicapped, however, by lack of interest among their members and by inadequate funds. Most of them can also claim only a small percentage of companies in the industry as members, although the membership controls most of the producing capacity. It is the small producers who can benefit most from membership in a trade association, but few of them belong to one.

THE amount and type of research which can and should be done varies with the different industries in this field. In some, research already under way compares with that of any other industry in scope and volume; in others, only the most elementary and objective research is possible. Many small producers, especially in the latter type of industries, could find no justification for independent research and little for any other type. However, all producers benefit from research directly or indirectly and all should support the advancement of our general technology in some way. Those who cannot afford to do research can justify belonging to and supporting an industry association and its research program. Everyone can also help by encouraging and helping bright young people to enter the field of industrial research.

Modern Concrete

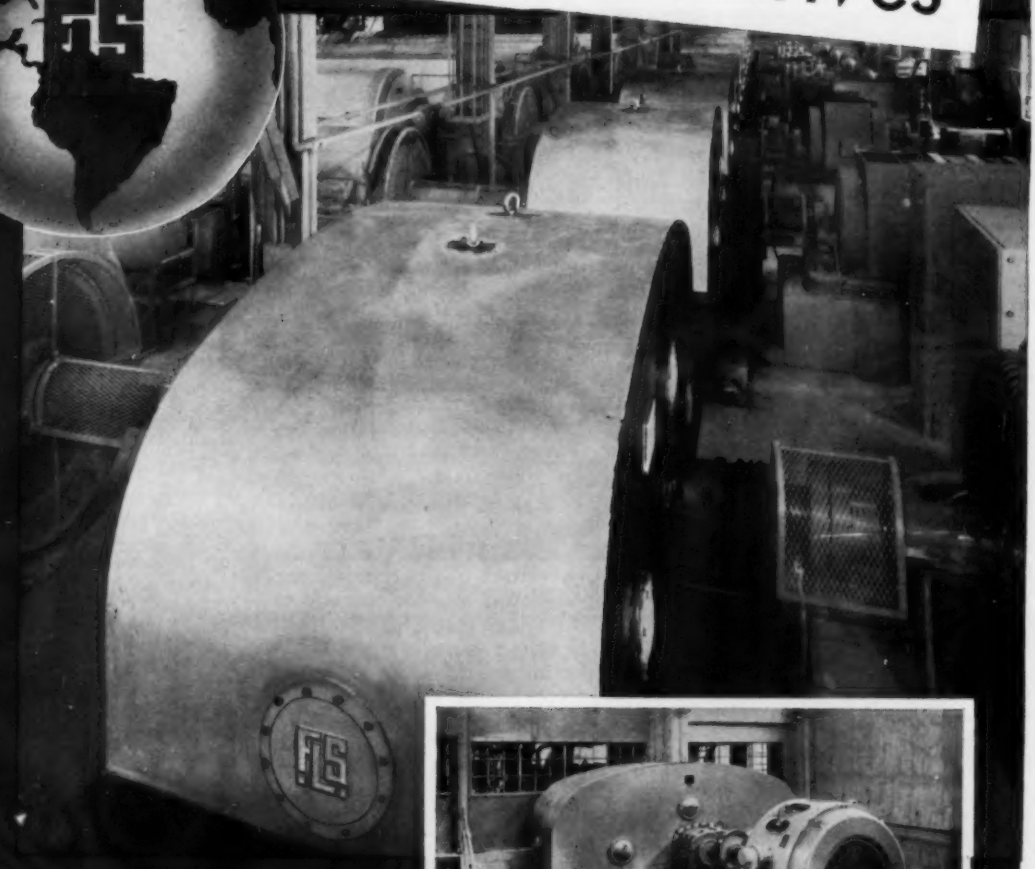
OUR readers will notice, on looking through this issue, that the CONCRETE MANUFACTURER section usually bound in with it is missing. Beginning with the June, 1957, issue the CONCRETE MANUFACTURER, under its new name of MODERN CONCRETE, is a completely separate and individual magazine. Actually, it has been just that for many years, both in its editorial treatment and in the fact that many thousands of copies of each issue were printed and distributed separately.

The main reason for taking this step is our conviction that the concrete industries should have a magazine of their own. We had long contemplated such a move, but until recently there was not sufficient economic or other justification. These industries were large and growing rapidly in many ways, but too many regarded them as offshoots of the pit and quarry, construction and building, and building supply fields, etc., rather than as a separate field. The recent accelerated growth of these industries, particularly with respect to new products such as prestressed units, and the obviously bright future for them as a whole, has changed the picture entirely.

BECAUSE of our belief in the importance of this field and its future growth, we took our first step toward separation nearly two years ago, when the concrete chapters of the 1955 PIT AND QUARRY HANDBOOK were taken out of it and published entirely separately as the CONCRETE INDUSTRIES YEARBOOK. The removal of the CONCRETE MANUFACTURER from PIT AND QUARRY is the logical second step. This was also felt to be the best time to make the long-contemplated name change to MODERN CONCRETE, which was selected because it is more descriptive of this growing field.

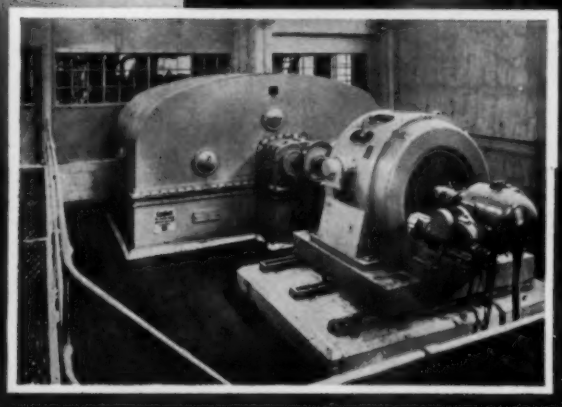
Walter E. Jaeger

Symetro Drives



Years of continuous, reliable performance at highest efficiency and negligible maintenance.

Over 7500 HP transmitted through Symetro gears direct to trunnions of raw mills in cement plant illustrated above.



Driving station for large clinker mill showing motor and Symetro gear in separate enclosure.

For Smidth Machinery apply to:

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Washington News Letter

By S. HERBERT UNTERBERGER

WHILE the politicians in Washington are promising both budget cuts and tax cuts, the more hard-headed observers of the Washington scene are predicting that by the time this session of Congress ends, there will be very little of either.

The budget has been, perhaps, the hottest issue in town. Because the politicians on the Hill were hacking away at it with such unreserved glee, thereby placing the President's total program in serious jeopardy, he took the issue directly to the voting public. The signs are beginning to appear that the voters at home, who really elected Eisenhower to the presidency, are taking pen in hand with increasing frequency to tell their representatives to support their President.

The change in attitude toward the budget demanded by the President, and predicted so often by political observers who have seen budget-cutters come and go, appears to be setting in. The President has already made some compromises in his budget requests, particularly for foreign aid, and he may even be willing to make a few more here and there before the fight is over.

It is unlikely, however, that all of the original Eisenhower budget will pass, or even that the lower compromise amount will be approved. This is not to say that the total appropriations will not, in fact, finally be as great as those suggested by the President. This is the usual pattern. Year after year budget requests are cut with much fanfare and flurry, but eventually the amount Congress appropriates appears somehow to total a higher figure than anyone would have imagined.

The danger in this process, and one that Administration officials are aware of and afraid of, is that the budget will not be any lower but that it will include items which are dear to the hearts of the congressmen but not necessarily very important in the total picture, while significant programs, necessary to the national defense and to world peace, will have the heart cut out of them. The old Washington hands are beginning to talk about the fact that the weather is getting warm; and that when that happens, the members of Congress get restive and want to go home. Appropriations must be acted upon, and in this environment this is frequently done hurriedly and without adequate consideration. In the past, this has happened so frequently, and with such monstrous results, that the outcome is almost predictable.

It looks now as if, even if the budget cutters are successful, the total appropriations are unlikely to be cut by more than $1,000,000,000; and because declines in expenditures do not immediately follow declines in appropriations, the total amount of money spent by the Federal Government in the next year is unlikely to be reduced at all.

All of this has a very substantial effect on the possibility of turning the talk about tax relief into actuality. In the President's original budget, his estimate of tax income exceeded his requested appropriations by about $1,800,000,000. This is the surplus which the Administration defenders have been talking about.

It now looks as though the estimate of tax income is likely to be much too high. It was based on the assumption of a continuing business expansion and further rises in the national income. Last year the President was lucky. He estimated a national income of $60,000,000,000. When the year ended, it turned out that the actual national income was much higher — $68,200,000,000. Since the tax take rises much more rapidly than the national income, primarily because we have a progressive income tax, a surplus of unexpected size resulted. By now, we are far enough along in 1957 to know that a similar happy development cannot be relied upon.

At the moment, the economy does not appear to be either gaining or declining. From present indications, this lack of trend will probably continue for several months. However, economists and other students of the business scene are predicting a downward slide of moderate dimensions thereafter. In part, this prediction results from the fact that the important automobile industry, which has been hoping for and even predicting a spring pickup, has been disappointed. The principal selling season is just about over, but no spurt in sales occurred. As a result, a cutback in automobile production is almost certain.

The other problem industry, of course, is home building, which is also continuing at a very slow pace. Here, too, a prediction that no pickup is immediately in sight is almost certain to be correct.

On the other hand, no one is predicting a serious depression, but this is the kind of situation in which costs, particularly labor costs, continue to rise while sales volume and prices continue to hold constant or, perhaps, fall off a little bit. The inevitable result is a squeeze on profits; and since a good part of the government's tax income comes out of corporate profits, government income may decline. At the very least, it is unlikely to increase at anything like the rate the President expected. The net result is that if the budget is to approach balancing, a project close to the President's heart, tax cuts are quite unlikely.

The politicians have been promising tax cuts. It can be presumed, therefore, that there will at least be some attempts to accomplish this, although the chance of success in this session of Congress appears to be slim indeed. There are very few new ideas in the proposals which are being made.

The simplest of them, and the one which probably has the most backing, calls for a rise in the exemption for each individual and each dependent from the present level of $600 to $700. Obviously, this would give practically all of the tax relief to people with small incomes. Several million families, who now pay

(*Continued on page* 148)

Here's MORE efficient driver speed for HEAVY Loads

ALLIS-CHALMERS TEFC Wound-Rotor MOTORS

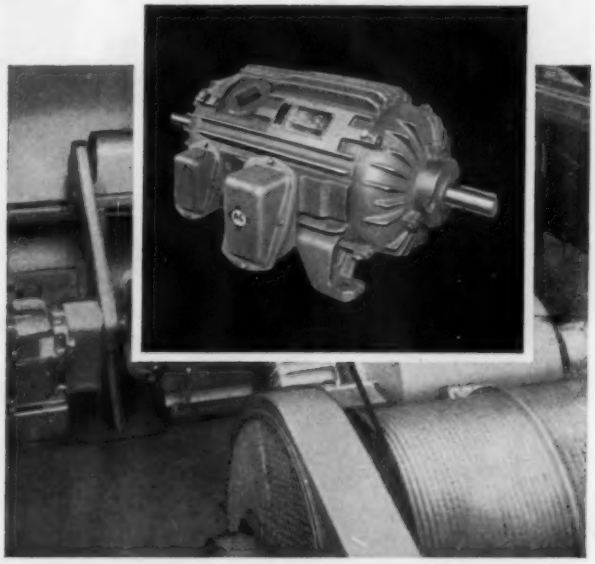
Where high inertia loads must be accelerated quickly and smoothly — yet power supply is limited — the Allis-Chalmers wound-rotor motor proves its efficiency . . .

High starting torque with this motor requires relatively low line-current. In addition, adjustable acceleration and running speed are possible through use of simple controls.

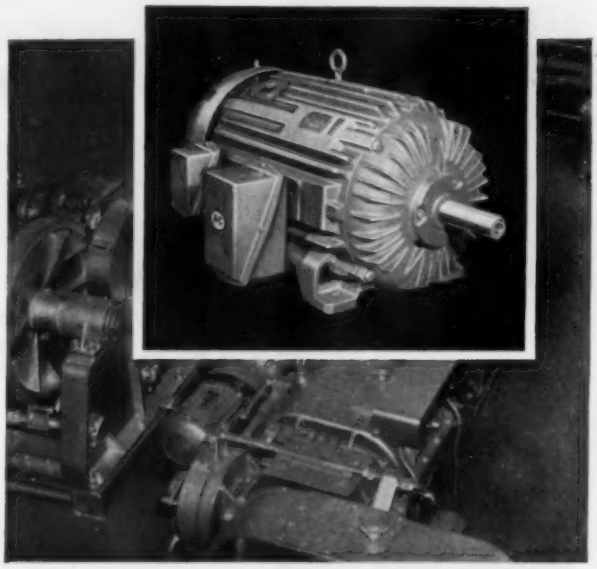
Other features of the TEFC wound-rotor motor include:

1. **Rib construction** provides ample cooling surface.
2. **Single enclosure** surrounds stator, rotor, slip rings, brushes and brush rigging. Gives maximum protection in moist, dirty, corrosive or hazardous atmosphere.
3. **Cast-iron frame** contributes rigid, distortion-free bearing support and keeps alignment true.
4. **Easy access** to collector rings and brushes permits on-the-spot inspection of brushes and commutators.

If you use hoists, lifts, cranes, conveyors, crushers or mills, find out more about the "MORE" in Allis-Chalmers wound-rotor motors. A-C motors also are available in various open types. Contact your nearby A-C sales office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



For intermittent duty, this totally-enclosed, non-ventilated model is available in frame sizes 284 to 505 inclusive. Above 505 frame, Allis-Chalmers offers its famous tube-type motor.



For continuous service, this tough, fan-cooled model is ideal. All enclosed motors can be furnished in standard enclosed or explosion-proof construction rated 55 C rise.

A-5180

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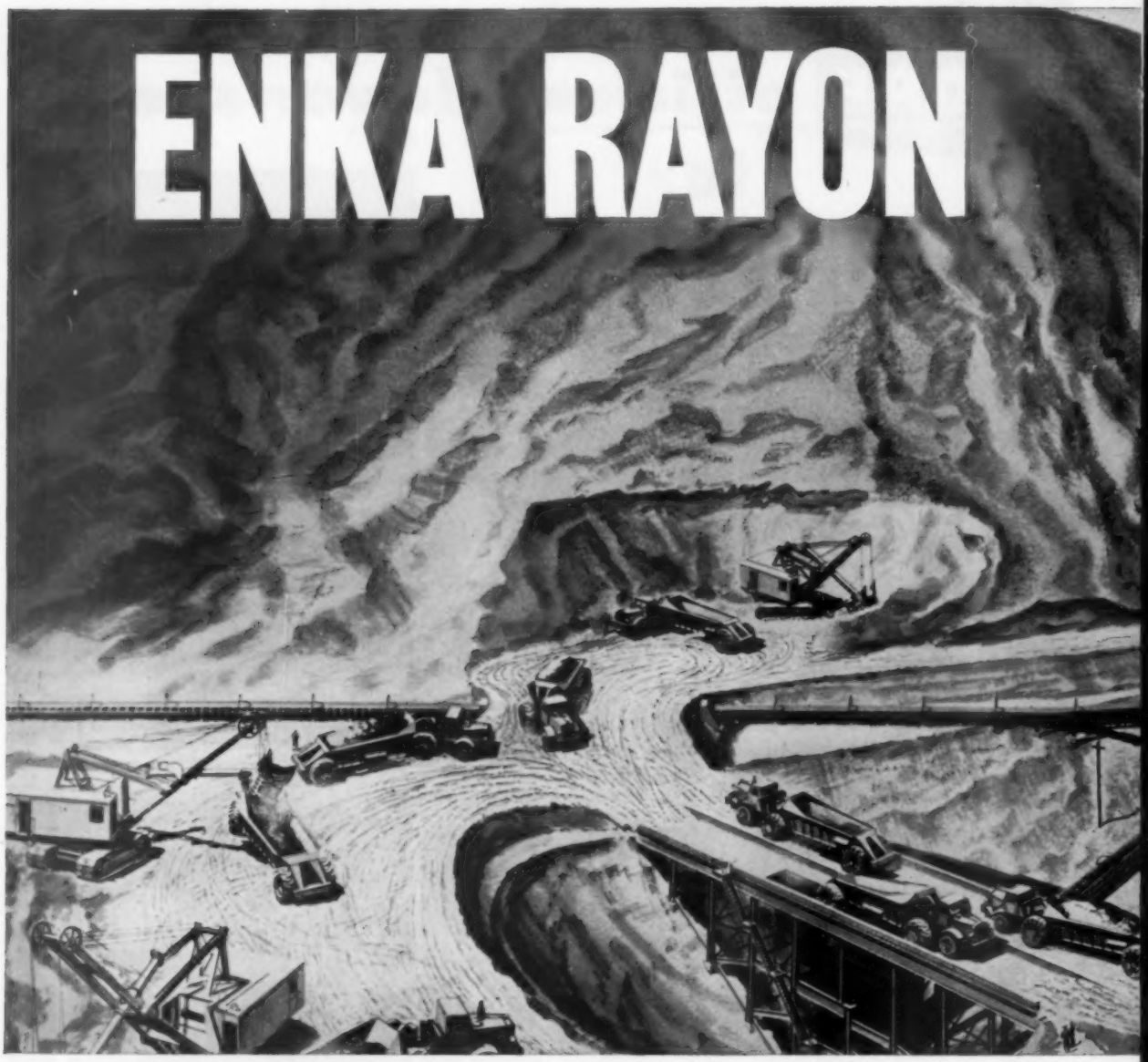
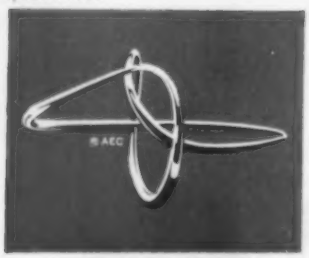
ENKA RAYON



doing one of the toughest jobs ever

Enka—
symbol of quality
and service in
synthetic fibers



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producers of Jetspun® • filament and staple rayon • filament and staple nylon

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Artwork : Courtesy Hewitt-Robins

tackled by a conveyor belt system

Hewitt-Robins has specified Enka High Tenacity Rayon in a 1.8 mile conveyor belt system designed for Southern Pacific. Enka High Tenacity Rayon is helping to move 90,000 tons of gravel a day. Enka Rayon brings to this job exceptional strength and durability combined with flexibility, plus outstanding resilience and tension and abrasion resistance.

This means that by specifying Enka High Tenacity Rayon in your conveyor belts you get the above advantages and you get them at lower cost. Call or write for further information.

United States Steel

new, high-performance Forged Grinding Balls

FREE!

Send for this new, free booklet describing in more detail the characteristics which make these new, high-performance USS Forged Grinding Balls the best value for the money.

USS Forged Grinding Balls

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UNITED STATES

announces

made of either Carbon-Manganese or Alloy Steel

New equipment and new standards of quality control make the new USS Forged Steel Grinding Balls the very best you can buy.

The chemical composition and heat treatment of these new balls were designed to obtain a high level of hardness combined with sufficient toughness to minimize breakage. This combination assures you of excellent ball performance.

USS Forged Carbon-Manganese Grinding Balls are designed to withstand the rugged treatment found in most mills. USS Alloy Grinding Balls were developed for use in unusually severe operating conditions. Both types are available in the same sizes: ¾", ⅞", 1", 1¼", 1½", 2", 2½", 3", 3½", 4", 5".

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S T E E L

Tumbling terrain buried more than 500 feet of 5-year-old Anaconda 3/0 Awg SH-D Shovel Cable. Despite accident, cable continued to supply power without interruption to giant shovel.

...and the wall came tumbling down

When this 90-foot wall came down unexpectedly, a five-year-old length of Anaconda 3/0 SH-D Shovel Cable was buried under thousands of tons of jagged rock.

Yet – *after ten days* – the cable and shovel it supplied continued to operate! Later, the cable was relocated–and is still giving service.

NEW BUTYL INSULATION

Longer life, better performing cable is the result of advanced engineering and manufacturing know-how that go into all Anaconda mine cables. Securityflex* Type SH-D Shovel Cable, for instance, is made with high-grade butyl insulation that withstands ozone, heat and moisture. Neoprene jacket is extremely tough and abrasion-resistant. Patented rubber cores cushion the ground wires and help prevent breaks.

Safety and economy of Anaconda cables have been proven in mines all over the world. The *Man from Anaconda* will be glad to help you on any cable problem. For cable, see your Anaconda distributor. And for copy of booklet, "*. . . and the wall came tumbling down,*" write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

*Reg. U. S. Pat. Off. 56329

ASK YOUR DISTRIBUTOR FOR

Sharp corner of rock caught and held taut the Anaconda Shovel Cable – but didn't break it.

Giant rock scissors pinched the cable in viselike grip without damage to insulation or ground wires.

Like a guillotine, yet tons of rock did not puncture cable nor interrupt flow of power to the shovel.

Rockfall crushed and partially buried the cable all along its length – but not a single break occurred.

ANACONDA® MINE CABLE

How RAYMOND Flash Drying
cuts the cost of powdered materials

DRIES *while it*

GRINDS *while it*

CLASSIFIES . . . .

Simultaneously
Automatically
Economically

Write for Raymond Bulletin #77 which describes various other applications of Flash Drying.

The Raymond Imp Mill combines a series of operations in a single, compact unit of equipment . . . clean, dustless, efficient . . . without any separate conveyors or dryers.

This modern method has proven to be of great economic value to the non-metallic mineral industries for the preparation of superfine grades of powdered materials which must meet today's exacting specifications for top-level quality, uniformity and sanitary production.

The Raymond system is efficient in handling various types of clay, where the raw material carries considerable moisture. The clay may be fed directly to the mill in lumps about ½" size, containing approximately 25% moisture. It is dried down to less than 2% and simultaneously pulverized to a fineness of 99% minus 200 mesh at an average capacity of 5000 lb. per hour.

This modern method is also useful for processing many other powdered products—write for information.

RAYMOND IMP MILL

WITH FLASH DRYING ACCESSORIES

For removing moisture from powdered materials while pulverizing, and delivering a fine, dry, free-flowing product.

The package type furnace supplies heated air to the mill system for the drying action. Easily regulated to control the final moisture content in the finished material.

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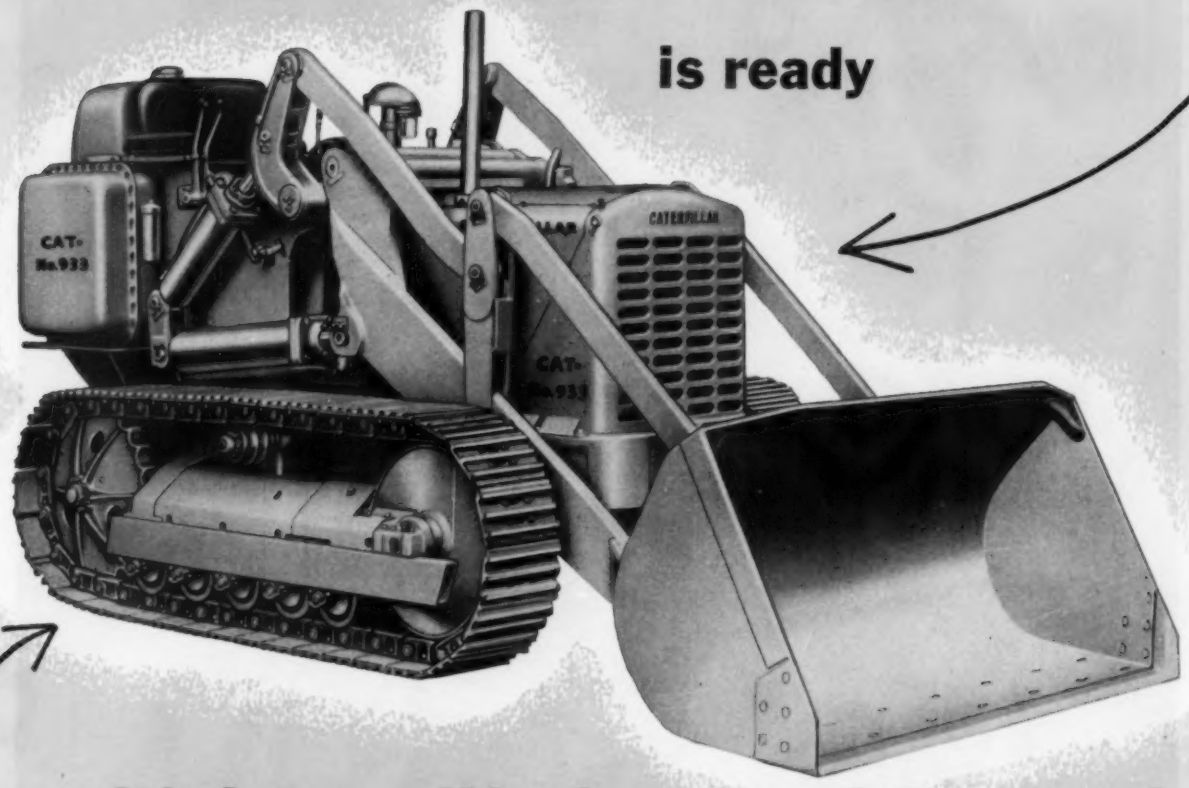
ANNOUNCEMENT! The new, improved

No. 933 (Series E) TRAXCAVATOR*

is ready



with longer life, lower maintenance!

Looks a lot like the popular No. 933 you already know—but there's greater stability, performance and durability built into this new Series E!

Now the rugged CAT* No. 933 Traxcavator includes a new heavy-duty undercarriage with:

- New Rugged Track Roller Frame
- New Solid Sprockets
- New Heavier Idlers
- New Tough Track Rollers

The complete line of Cat-built Traxcavators	No. 977	No. 955	New No. 933 (Series E)
Flywheel HP at sea level	100	70	50
Bucket capacity, cu. yd.	2¼	1½	1
Bucket tip-back at ground level	40°	40°	40°
Bucket tip-back at maximum lift	46½°	47½°	48°
Dumping height (center of hinge pin to ground)	141½"	128"	119 1/16"

The easy operation, the great capacity and the dependable power—these features remain as outstanding as before.

For complete details on this *tough* new Traxcavator, call your Caterpillar Dealer. He'll be glad to give you full information on the complete line of Cat-built Traxcavators. He's the man to remember, too, for expert service and for replacement parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.

Carbon steel formerly used in this Simplicity aggregate drier wore out from smashing impact after handling 1¼ million tons of crushed dolomite but life expectancy is now over 4 million tons. Drier operates in one of the plants of The J. E. Baker Co.

Lukens "T-1" steel triples life of rock drier

TRADEMARK

Are impact and abrasion shortening the life and rocketing the costs of your equipment? If so, there's a lesson here for you:

When the liner shell and partition plates of this 10 x 20 foot Simplicity aggregate drier were replaced with Lukens "T-1" steel, life expectancy increased threefold!

Whether you handle stone, coal, or metal ores, it will pay you to investigate Lukens "T-1" steel for surfaces hard-hit by impact and abrasion. The 321 minimum Brinell quality has been known to outlast ordinary steels by 18 to 1. Applications are many throughout the materials handling and processing industries. Wear plates, chutes, hoppers, and mine cars are typical.

The remarkable combination of hardness and toughness in this high yield strength, readily welded alloy steel is even maintained at temperatures well below zero. *Send for informative illustrated booklet, "Lukens 'T-1' Steel." Write Manager, Marketing Service, Room 903, Lukens Steel Company, Coatesville, Pennsylvania.*

LUKENS ®

Helping industry choose steels that fit the job

News of the Industry

Louis R. Forbrich Named New General Manager Of Green Bag Cement Div.

Louis R. Forbrich has been appointed general manager of the Green Bag Cement Division of the

Louis R. Forbrich

Pittsburgh Coke & Chemical Company, Pittsburgh, Pa.

Mr. Forbrich joined Pittsburgh Coke in 1946, and in 1950 he was appointed superintendent of the division, the position he has held until his recent promotion.

Prior to his association with Pittsburgh Coke, Mr. Forbrich was a research chemist for the Portland Cement Association in Chicago, served as director of research and development for the Bessemer Limestone & Cement Company, and was employed in the research and development department of the Master Builders Company.

Riverside Cement Co. Installs Dust-Collecting System

The Riverside Cement Company recently installed five new dust-collecting units at its Oro Grande (Calif.) Division. The new equipment is in the form of collection caps which have been placed on the five cooler stacks at the discharge end of each 350-ft. rotary kiln. The units were of the company's own design.

The collection caps operate on labyrinth principle. By changing the direction of the air flow several times, the particulate matter is precipitated both by reason of centrifugal force and through reduction in velocity in the exhaust air flow. Such particulate matter which might otherwise be exhausted up the stacks is collected in hoppers and conveyed back to the system through a series of ducts. The installation of the new custom-built equipment has proved to be an extremely effective addition to the dust control system.

A cement plant has been installed at Biniamar, near Inca (Majorca). The plant has a 30,000-ton yearly capacity, which can be doubled.

Coming Events

June 6-8, 1957 — Colorado Springs. Annual convention, National Lime Association. Broadmoor Hotel.

June 16-21, 1957—Atlantic City. 60th annual meeting, American Society for Testing Materials. Chalfonte-Haddon Hall.

July 18-19, 1957—Hot Springs, Va. Directors' meeting, National Crushed Stone Association. The Homestead.

July 29 - August 2, 1957 — San Francisco. World Conference on prestressed concrete and third annual meeting, Prestressed Concrete Institute. Fairmont Hotel.

August 25-31, 1957—Murray Bay, Canada. Semi-annual directors' meeting, National Sand and Gravel Association and National Ready Mixed Concrete Association. Manoir Richelieu.

Construction Under Way At Redwood, Miss., Plant Of Mississippi Valley P. C.

Construction of Mississippi's second multimillion-dollar cement plant, being erected by the Mississippi Valley Portland Cement Company, began on April 29 at Redwood, Miss., near Vicksburg.

The new plant represents an investment of $3,700,000, according to Robert W. Hyde, president of the firm. Within a year the new plant will be producing approximately 680,000 bbl. of cement annually, valued at $2,500,000.

Plants in New Orleans, Cuba Planned by Freeport Sulphur

The Freeport Sulphur Company, New York, N. Y., is considering construction of ore processing plants on the Misssisippi River near New Orleans and in Cuba as a part of its $100,000,000 expansion program.

Jack Carrington, vice-president, said the New Orleans plant definitely will be erected in the Gulf coast area, with Braithwaite in Plaquemines parish as a possible site. The Cuban plant will be built at Moa Bay, on the northern coast. It was not stated how much of the $100,000,000 would be spent for each of the two facilities.

Expansion is the result of the signing of a new contract under which the Federal Government will purchase nickel and cobalt from Cuban-American Nickel Company, a Freeport subsidiary.

The Susquehanna Quarry Company of Millersburg, Pa., recently began operations in its new limestone quarry near Oval, Pa. Leon Kocher is president and general manager of the company, which also operates a large quarry at Millersburg, as well as three portable plants.

William Malloy and Mike Malloy recently announced the sale of the Malloy Construction Company's sand and gravel plant and equipment located in Casper, Wyo., to the F & M Ready Mix Company, now to be known as the Platte Sand and Gravel Company.

New Organizational Setup Of A.I.M.E. Structure Creates Three Societies

As a result of action taken at its recent annual meeting in New Orleans, the American Institute of Mining, Metallurgical, and Petroleum Engineers (A.I.M.E.) has reorganized its structure.

Previously known as the Mining, Metallurgical and Petroleum Branches of A.I.M.E., the units are now the Society of Mining Engineers of A.I.M.E., the Metallurgical Society of A.I.M.E. and the Society of Petroleum Engineers of A.I.M.E. Although each has its own officers and administrative setup, the three constituent societies remain under the A.I.M.E. board of directors.

The national president of A.I.M.E. is Grover J. Holt, Ishpeming, Mich., general manager of The Cleveland-Cliffs Iron Company. The secretary is Ernest O. Kirkendall. Headquarters of A.I.M.E. and the mining and metallurgical societies are in New York. The petroleum headquarters will remain in Dallas.

Elmer A. Jones, first president of the Society of Mining Engineers of A.I.M.E., is manager of the Southeast Missouri Division, St. Joseph Lead Co., in Bonne Terre. The new post of past president of the Society of Mining Engineers of A.I.M.E. is held by Will Mitchell Jr. of Milwaukee, Wis., assistant research director of Allis-Chalmers Manufacturing Company. Mr. Mitchell was chairman of the Mining Branch Council. Arnold Buzzalini is secretary of the society.

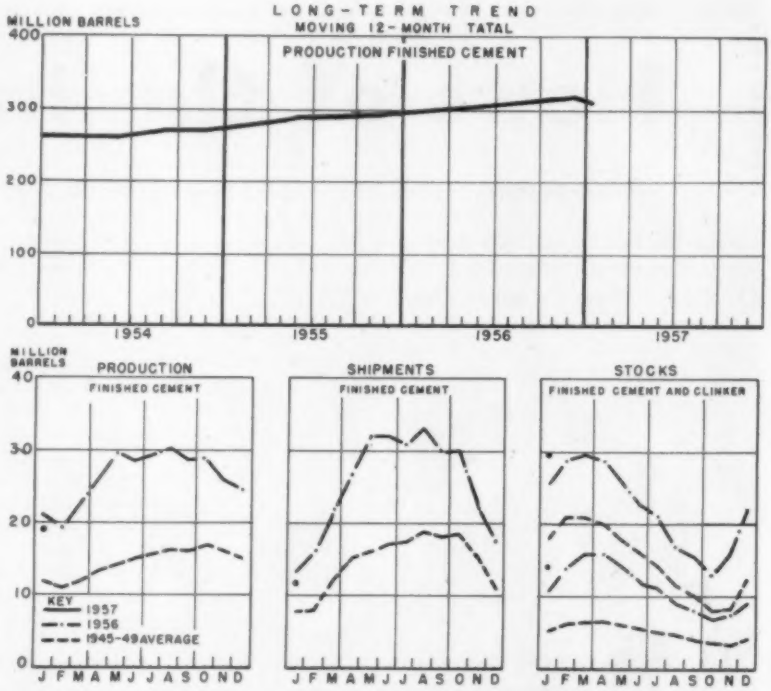
The president of the Metallurgical Society of A.I.M.E. is John C. Kinnear Jr., McGill, Nev., general manager, Nevada Mines Division, Kennecott Copper Corp.

Vice-president of the Metallurgical Society of A.I.M.E. is Walter R. Hibbard Jr., Schenectady, N.Y., manager of the Alloy Studies Research Laboratory, General Electric Co. Robert W. Shearman is secretary-treasurer.

The first president of the Society of Petroleum Engineers of A.I.M.E. is John P. Hammond, assistant general superintendent of the Amerada Petroleum Co., Tulsa, Okla. The vice-presidents are George R. Gray, laboratory manager, Baroid Sales Division, National Lead Co., Houston, Tex., and Earl M. Kipp, chief engineer, The California Company, New Orleans, La. Joe B. Alford is executive secretary.

The new A.I.M.E. bylaws provide that the Metallurgical Society of A.I.M.E. shall consist of the Institute of Metals Division, the Iron and Steel Division, and the Extractive Metallurgy Division. The Society of Mining Engineers of A.I.M.E. shall consist of the Coal Division, the Industrial Minerals Division, the Minerals Beneficiation Division, and the Mining, Geology and Geophysics Division. The Society of Petroleum Engineers is not set up in divisions.

Each of the three societies, in rotation, will name the A.I.M.E. national president for one year. Each year each of the societies will elect two A.I.M.E. national directors for three years and will designate two of its seven institute directors as A.I.M.E. national vice-presidents for one year.



This report includes a summary of data for December, 1956, and a breakdown of production and shipments in January, 1957. DECEMBER, 1956, SUMMARY—Production of finished portland cement in December, 1956, as reported to the U. S. Bureau of Mines, totaled 24,429,000 bbl., an increase of 6 percent over the December, 1955, figure. Mill shipments in December, 1956, totaled 17,822,000 bbl., an increase of 5 percent over the December, 1955, figure. Stocks of 22,412,000 bbl., of finished portland cement on hand on December 31, 1956, were 28 percent more than those on hand on December 31, 1955. Clinker production during December, 1956, totaled 26,450,000 bbl., an increase of 3 percent over the December, 1955, figure. More than 160 plants in 37 states and Puerto Rico reported production. High-early-strength portland cement produced in December, 1956, totaled 1,501,000 bbl., an increase of 1 percent over the figure for December, 1955. Prepared masonry cement produced in December, 1956, totaled 998,000 bbl., a decrease of 15 percent from the total in December, 1955.

JANUARY SUMMARY—Production of finished portland cement, as reported to the U. S. Bureau of Mines, totaled 19,308,000 bbl., a decrease of 1 percent from January, 1956. Mill shipments in January, 1957, totaled 11,805,000 bbl., a decrease of 11 percent compared with January, 1956. Stocks of 29,819,000 bbl. of finished portland cement on hand January 31, 1957, were 17 percent more than on the same date last year. Clinker production during January, 1957, totaled 24,412,000 bbl., a decrease of 3 percent from the January, 1956, figure.

PRODUCTION—One hundred and fifty-eight (158) plants in 37 states and Puerto Rico reported a production of 19,308,000 bbl. of finished portland cement during January, 1957, compared with 21,440,000 bbl. in January, 1956.

Clinker production during the month of January, 1957, was 24,412,000 bbl., compared with 25,153,000 bbl. during the same month last year.

Production of high-early-strength portland cement in January, 1957, totaled 1,741,000 bbl., an increase of 18 percent over the January, 1956, production.

Production of prepared masonry cement was 962,000 bbl. during January, 1957, a decrease of 8 percent from the January, 1956, production.

SHIPMENTS—Mill shipments of finished portland cement for January, 1957, totaled 11,805,000 bbl., compared to 13,273,000 bbl. in January, 1956.

In January, 1957, shipments were higher in six (6) districts and lower in seventeen (17) districts than in January, 1956.

Mill shipments of high-early-strength portland cement in January, 1957, totaled 726,000 bbl., an increase of 8 percent over the 671,000 bbl., shipped in January, 1956.

Mill shipments of prepared masonry cement in January, 1957, totaled 485,000 bbl., a decrease of 24 percent from the 636,000 bbl. shipped in January, 1956.

STOCKS—Mill stocks of 29,819,000 bbl. of finished portland cement were on hand January 31, 1957—17 percent more than the 25,454,000 bbl. on hand January 31, 1956. Stocks of clinker on hand January 31, 1957, totaled 14,171,000 bbl., an increase of 35 percent over Jan., 1956.

U.S. NOW 57

PRODUCTION OF SPECIFICATION FINE AGGREGATES at WIDELY SCATTERED PIT SITES!

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Eagle Portable Washing-Classifying-Dehydrating Section

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Operating in a dry pit or with hydraulic dredge, the unit removes excess silt-laden water and classifies the desired aggregate which is dehydrated by the two screw washer-classifier-dehydrators. Material delivered suitable for handling by conveyor to stockpiles or bins, or by trucks. Both screws can produce same product or each can produce a separate gradation—facilities provided to remove overage of any excess sand meshes.

This simple, compact, economical Eagle Portable Section can process up to 200-tons per hour of specification material. Design based on Eagle's long experience and field testing. Get the complete story—send for Bulletin 557.

√ ***Check These Advantages:***

- Fast take-down, transport and erection means less down time when changing pits.
- Flexibility—use both screws to produce one product or produce a different gradation with each screw.
- Field-proved automatic bleeder valves give attention-free operation—minimum man power.
- Easy manual control of Splitter Gates with Blending Flumes adapts unit to variety of pit conditions.
- Quickly returns its cost through mobility plus capacity and range of materials.

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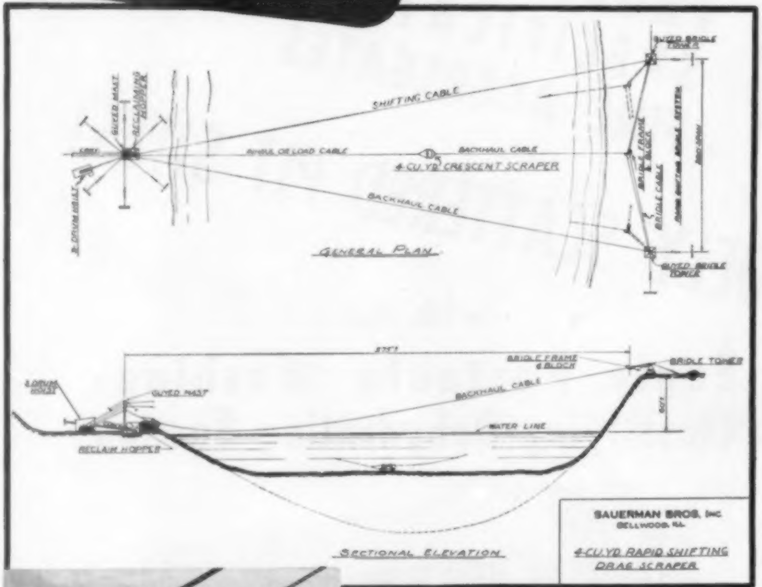

Above drawing was prepared for a specific drag scraper installation and does not represent maximum spans.

View shows rapid shifting bridle frame and all operating cables. Crescent may be seen in background conveying load to reclaiming hopper just in front of mast.

•

Contact Sauerman's engineering department for specific recommendations and information. No obligation.

Ask for Catalog A, Drag Scrapers—24 pages of job photos and specifications. Request Field Reports showing your material being handled by the low cost Sauerman Method.

The Sauerman Method works equally well over widely differing areas and span limits . . . on hills, swampy ground or underwater . . . handles any material a dragline can dig.

Every scraper machine is powered by a Sauerman Roller Bearing Hoist, especially designed to withstand sudden shocks and changes in speed.

When a rapid shifter is used, a third hoist drum is added to shift the bridle frame. The rapid-shifting bridle system (upper right of drawing) permits frequent shifting of the scraper's line of operation in non-caving material, shallow excavations or overburden.

Operating costs are lower—basically, it is cheaper to drag material than it is to lift and transport it. You eliminate the power costs of moving heavy machinery about the area. You pay only for pay loads—not dead weight. When expendable parts—sheaves, clutch or brake linings—are replaced, the machine is restored to practically new condition.

Sauerman can help you select the method of materials handling most profitable for your job—a system that will give you the lowest cost per cu. yd. handled.

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Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

Dodge Reports Sharp Rise In March Contracts, Setting Record for Month

Contracts for future construction in the United States were up sharply in March, as compared with the same month last year, according to F. W. Dodge Corporation.

The total of $3,077,997,000 in March was 11 percent ahead of the corresponding month of 1956. This was the largest percentage increase registered in recent months.

Thomas S. Holden, Dodge vice-chairman, reported that, while strictly comparable figures are not available for years before 1956, the March level of construction contract activity was an all-time March record.

"The March figures included a number of unusually large contracts," Mr. Holden noted. "Among them were two office building projects in Manhattan which together totalled over $100,000,000, a $75,000,000 pipeline development in Texas, and a water supply project in California at almost $50,000,000."

The increase in total construction contracts came in spite of a decline in the residential category. The March figure for residential contracts was $1,107,288,000, down 7 percent from the total for March, 1956.

Mr. Holden noted that "the number of dwelling units represented by the March residential contracts was 84,497. While this was a substantial increase over February, it was 13 percent below a year ago. The difference between the 7 percent decline in dollars and the 13 percent decline in units can be traced to the fact that housing units tend to be somewhat larger and the price tags are higher."

March contracts for non-residential building amounted to $1,092,441,000, up 3 percent from last March. Within this category, manufacturing buildings and public buildings were far below the year-ago level, but all other major non-residential types showed increases.

The major factor in the rise in total construction contracts, however, was a 69 percent increase in the heavy engineering category. The March total for heavy engineering was $878,268,000.

Cumulative construction contract totals for the first quarter of 1957, with percentage changes from the first quarter of 1956, are as follows: non-residential building, $2,826,647,000, up 9 percent; residential building, $2,799,340,000, down 5 percent; heavy engineering, $1,912,573,000, up 14 percent; total construction, $7,538,560,000, up 4 percent.

Robert M. Cox

Robert Sunderland

Election of Three Executives Announced for Ash Grove

Several executive changes in the general office staff of the Ash Grove Lime and Portland Cement Company, Kansas City, Mo., have been announced by Lawrence Kittle, president.

Robert M. Cox, formerly treasurer and general auditor, was elected to the office of vice-president. Mr. Cox joined Ash Grove in 1927, following his graduation from Kansas University. He was made treasurer and general auditor in 1951, and has served as the company's safety director for ten years.

Robert Sunderland, formerly secretary and assistant treasurer, was elected treasurer. Mr. Sunderland, started with Ash Grove in 1949 as an accountant.

James P. Sunderland, who was employed at Ash Grove's plant in Springfield, Mo., several years ago, has rejoined the company as secretary.

James Sunderland

Gypsum Declines in 4th Qtr. But Shows Total 1956 Gains

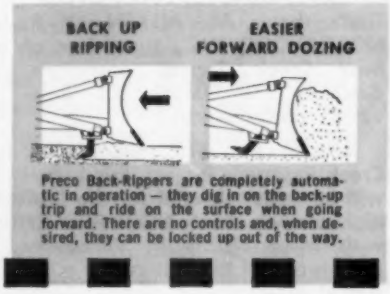
Output of gypsum from domestic mines dropped in the fourth quarter of 1956, according to reports from producers to the U. S. Bureau of Mines, and was 17 percent less than in the fourth quarter of 1955. Imports also decreased 17 percent. The apparent supply of crude gypsum for the quarter totaled 3,320,495 tons, including 2,307,352 tons mined and 1,013,143 tons imported. Consumption of cement-retarder and agricultural gypsum was higher than in any previous fourth quarter, showing gains of 13 and 59 percent, respectively, over the corresponding period of 1955. However, production of calcined gypsum declined 17 percent to 1,861,087 tons. An increase of 3 percent in industrial plasters was more than offset by the decreases of 9 percent in building plasters, 23 percent in gypsum boards, and 20 percent in tile, compared with 1955.

The Lone Star Cement Corporation, New York, N. Y., has taken over the ownership of the Concrete, Wash., plant of Superior Portland Cement, Inc. The plant is officially known as the Superior Division, Lone Star Cement Corporation.

These Preco Back-Rippers, mounted on the reverse side of the bulldozer moldboard, dig in and rip **while the tractor backs up.** They make blading easier and faster because they rip out rocks, roots and hard ground, enabling the tractor to work a full blade with less horsepower on its next trip. This is **double-duty bulldozing.**

Like contractors all over America, you can save time and money by using Preco Back-Rippers in building pioneer roads, clearing land and rights-of-way, in gravel pit operations, slate breaking in coal strip mines, for logging operations and mounted on pusher tractors for faster scraper loading.

See your Caterpillar Dealer or send the coupon for information.



Preco Back-Rippers are completely automatic in operation — they dig in on the back-up trip and ride on the surface when going forward. There are no controls and, when desired, they can be locked up out of the way.

PRECO INCORPORATED
6300 E. Slauson Avenue
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Please send information on Preco Back-Rippers.

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Quoting H.E. (ACE) GREEN, tunnel superintendent: "EIMCO 105 Excavators with heft to dig fast and overhead discharge, are the fastest tunnel loaders I've worked with."

The project was organized on a two cycle, 24 hour timetable with two drill and two mucking shifts. Here, Eimco 105 and dump wagons wait out blasting operations.

Quoting J. E. R. WOOD, president, NORTHWOOD INC.: "The fact that we have four EIMCO 105's is proof we're sure they promote high tonnage production."

WILKES-BARRE, PA. - Operator JOSEPH WEIKEL of Pottsville, Pa., prepares to unleash the EIMCO 105 Excavator's tremendous digging power during Bear Creek Diversion Tunnel operations. His comment: "It's the digginest machine I've operated."

The 19' circular bore was blasted through 1,150 feet of rock by NORTHWOOD INC. U.S. Army engineers directed the project.

EIMCO 105 SAVES TIME MUCKING FOR TUNNEL DRIVERS

"SAVES MINUTES EVERY CYCLE." That's how AL AITKEN, V-P, NORTHWOOD INC., supervisor of Bear Creek Tunnel operations, describes the EIMCO 105 Excavator's performance.

Part of the $18 million Bear Creek Reservoir Project, this tunnel will be outlet channel for the 234' high earthen dam. NORTHWOOD, with main offices in Vancouver B.C., is one of the Continent's active tunnel drivers.

Equipped with 1½ yard excavating bucket, the EIMCO 105 loaded 100 cubic yards of material into dump wagons after each blast. Between 200 and 400 lbs. of dynamite, used in a 48-hole drilling and shooting pattern (usually fired in 10 stages of delay) produced an average advance of 7½' per round . . . 15' per day.

The tunnel was drilled to a bore size of 19' in the rough using 6 jack legs on a single deck jumbo. Concrete lining will reduce inside diameter to 16'. Six inch I-beam supports wedged tightly with wooden blocking are spaced every 4'. The EIMCO 105 now is taking up a 4' bottom left to provide flat surface for trucks.

NORTHWOOD'S high appraisal of the EIMCO 105 is duplicated often in field reports from tunnel projects and mines throughout the world.

With any attachment--Excavator, Front-End Loader, Bulldozer, Fork Lift, and others--EIMCO 105 owners get superior design . . performance speed and power . . . operating ease and economy . . . versatile maneuverability . . . dependable service under hard usage.

Plan now to learn why you can shade your next bid and still keep the profit by figuring earthmoving costs around the EIMCO 105.

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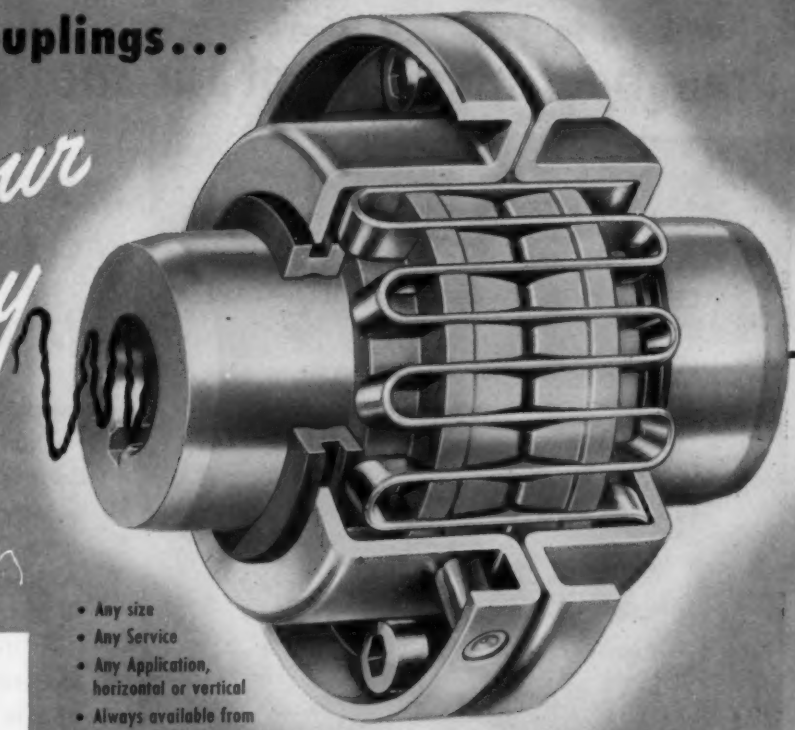
B 265

Falk Steelflex Couplings...

Protect your machinery in 2 ways



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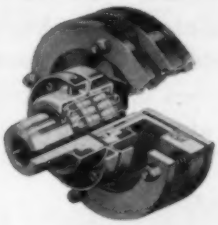
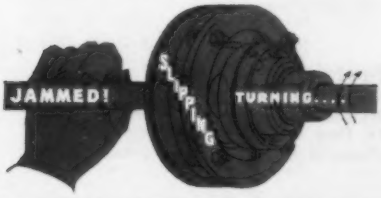


Falk Controlled Torque Couplings prevent damage from overloads

In applications where danger from overloads exists, use the FALK Type FT Controlled Torque Coupling. The Type FT has all the features and advantages of standard FALK Steelflex couplings—and, in addition, has an adjustable friction slip clutch, enabling the operator to set the coupling to slip at any predetermined overload.

This controlled-torque principle not only prevents transmission of dangerous shocks and limits overloads; it eliminates the breaking of shafts caused by jamming of driven equipment.

An outstanding advantage of the Type FT Coupling is that, as soon as the cause of the overload is removed, the entire coupling will rotate and transmit power without replacing parts or repairing coupling.



There's real economy in using Type FT Controlled Torque Couplings. Many users have reported that these couplings paid for themselves the very first time they slipped (under overload) because of the protection against damaged driving or driven machinery!

...cost less per year of service!

You get *double protection* when you connect your driving and driven machinery with a Falk Steelflex Coupling—the all-steel coupling with the exclusive grid-groove design! First, its *torsional resilience* smothers shock and vibration; and second, the Steelflex design prevents damage and lowered efficiency by accommodating shaft misalignment.

Why have increasing numbers of key men in industry standardized on Falk Steelflex Couplings? Their experience has proved that Falk Steelflex Couplings prolong the service life of their machinery... are trouble-free and need minimum maintenance ... are easy to install, lubricate and disconnect ... and *cost less per year of service* than ordinary couplings.

One basic Steelflex design—the type F, in its many sizes—is adaptable to more than 90% of all industrial applications. For applications involving danger from overloads, Modified Type FT Controlled Torque couplings (see column at left) are ideally suited. There are numerous other special or dual purpose Steelflex couplings for unusual applications. **Write to Department 247** for engineering bulletin, including selection and dimension tables.

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- **SPUN END, ONE-PIECE ROLLERS** . . . consisting of carrying surface and ends spun from a single piece of heavy gauge steel tubing plus an inner bearing tube welded to the spun ends.
- **PERMANENTLY SEALED** . . . precision ball or roller bearings are protected by a die cast labyrinth seal that will not corrode or wear . . . grease stays in, dust and dirt stay out.
- **PRE-LUBRICATED** . . . sufficient grease to last the normal life of each carrier is sealed into each roller at the factory. Alemite fittings also provide for easy re-lubrication if necessary.
- **QUICK-CHANGE ROLLER** . . . pre-adjusted rollers easily slide in or out of the hex slots in the end plates . . . provides fast roller changes without the use of tools.

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Alpha Portland Cement Co. Elects Officers, Directors—Gerstell Named President

At a recent meeting directors of the Alpha Portland Cement Company, Easton, Pa., elected R. S. Gerstell president, succeeding J. F. Magee, who was named chairman of the board. Mr. Magee will continue to serve the company as an executive officer.

Other officers elected at the meeting were J. D. McKelvy, vice-president; N. O. Wagner, vice-president in charge of sales; K. T. Wright, secretary and treasurer; and H. F. Stepanek, assistant secretary and assistant treasurer.

E. F. Brownstead was appointed general manager of operations, and R. L. Rhodes was named general sales manager.

The following directors were re-elected: Samuel G. Baker, Vermont Hatch, J. J. Matthes, John R. McCune Jr., Morris R. Williams, J. D. McKelvy, N. O. Wagner, R. S. Gerstell, and J. F. Magee.

Howard Hanks, who has retired from the position of vice-president in charge of manufacturing, will continue to serve the firm as a consulting engineer.

Safety Talks for Foremen Published in New Manual

Near Misses . . . Keep Your Guard Up . . . Stay on Your Feet—these aren't corner instructions to a punchy boxer, but some of the titles in a new volume of *Five Minute Safety Talks for Foremen.* This manual, Book 7, published recently by the National Safety Council, contains 52 talks on accident prevention.

The material was prepared by Roland F. Blake, a leader in safety engineering and editor and co-author of *Industrial Safety,* a book on accident prevention fundamentals. The five-minute talks are accompanied by outlines and text suitable for training sessions.

The booklet includes up-to-date material on such varied topics as vacation safety, smoking, horseplay, how to use a screwdriver, lung safety, and hot weather hints.

Further information and prices may be obtained from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

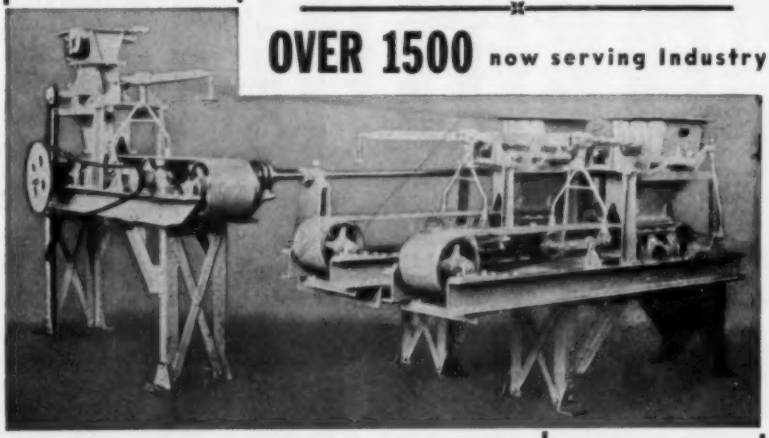
Cement production in Colombia has climbed from 705,000 metric tons in 1952 to nearly 1,300,000 metric tons in 1956, according to the Banco de la Republica, Bogota.

Do Scaling Troubles "get you down?"

HIGH-SPEED, AUTOMATIC, ACCURATE

SCHAFFER POIDOMETERS
provide a sure remedy

OVER 1500 now serving Industry



Bulk material handlers are immune to "headaches" in the scaling department—after SCHAFFER Poidometers are installed.

These units supply reliable weight data at any processing stage, whether the operation involves weighing, mixing, blending, feeding, recording or proportioning.

Durable, easy-to-operate Poidometers are unequalled for continuous, trouble-free, economical service.

Available with total weight recorders, and remote controls for showing and changing feed rate.

Battery of POIDOMETERS in Process Industry

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FOR YEARS OF HARD LABOR on the rock pile they selected BROOK MOTORS

May Gravel Corp., Fort Wayne, Ind., wanted an electric motor to power a massive rock crusher in their limestone quarry—a motor to withstand heat, cold, dust, moisture and shock loads. They wisely selected a BROOK 200 H.P., 900 R.P.M. motor. Another BROOK powers a 1500 g.p.m. drainage pump in this quarry. Both motors are performing splendidly—and will continue to do so—because they're built for a long service life under severe conditions. Yet, they cost no more (usually less) than ordinary motors. Send for literature.

FAST DELIVERY OF ALL POPULAR MODELS

Brook Motors are available from warehouses at Chicago, Dallas, Jersey City, Los Angeles, Memphis, St. Paul, Salt Lake City, San Francisco, Atlanta, Seattle, Tampa and other major distributing points.

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Old Mike Mine, Custer, S.D., To Be Purchased By 3M For Production of Mica

According to a recent announcement, Minnesota Mining & Manufacturing Company, St. Paul, Minn., will purchase the Old Mike Mine near Custer, S. D. After conducting field tests last summer to determine the suitability of the mineral deposits, 3M decided to use the purchase option, which it has held for some time. This option includes 25 mineral claims, the crushing and screening plant, and auxiliary equipment. The mine, together with unworked claims, covers about 500 acres.

Mineral Mines, Inc., of Custer, is the present owner of the mine, which has operated intermittently since 1880. It has not been in operation since shortly after World War II.

Acquisition of the Old Mike Mine will provide 3M with the first domestic source of mica to be used by its subsidiary, the Samica Corporation, Rutland, Vt., in manufacturing insulating papers. 3M will also provide mica to the American electronics industry, which had depended almost entirely on foreign sources for the mineral.

Operation of the Old Mike Mine will extend 3M's activities into South Dakota for the first time. Rated as one of the nation's outstanding growth companies, 3M has increased its sales from $75,000,000 in 1946 to more than $325,000,000 last year.

Southern Lightweight Aggregate Dedicates New Solite Plant

On June 1 the new Solite plant of the Southern Lightweight Aggregate Corporation, Richmond, Va., was dedicated at Leakesville Junction, according to an announcement made by John W. Roberts, president of the firm.

An interesting fact about the plant is its location—it is constructed on the state line. Most of the machinery and equipment is in Virginia, and the quarrying operation is predominantly in North Carolina.

Whitehead Bros. Company Plans Sand Operation On 1800-Acre S.C. Site

A sand plant which reportedly will be one of the largest in the South is soon to be built in Kershaw County, S. C., on 1,800 acres of land recently acquired by Whitehead Brothers Company, New York, N. Y.

The plant will produce fine quality silica sand, mined on the new site, for foundries and several other industries. It will also supply industries in South Carolina and nearby states using finely processed sands, according to the state development board.

Whitehead Brothers, which has sand plants in New York and New England states, has been in business for more than 100 years.

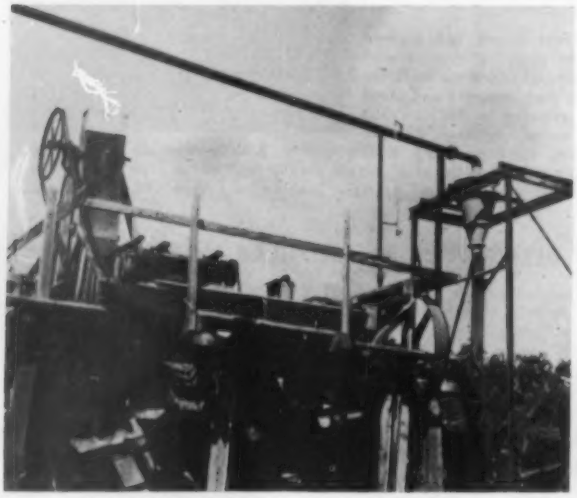
Net profits of the Georgia Marble Company, Tate, Ga., rose to $1,439,-325 in 1956, an increase of $36,076 over 1955, according to the company's annual report. Net sales amounted to $11,681,309 last year, compared with $10,823,483 in 1955.

Escondido Sand & Gravel Develops New Method Of Clean-Sand Recovery

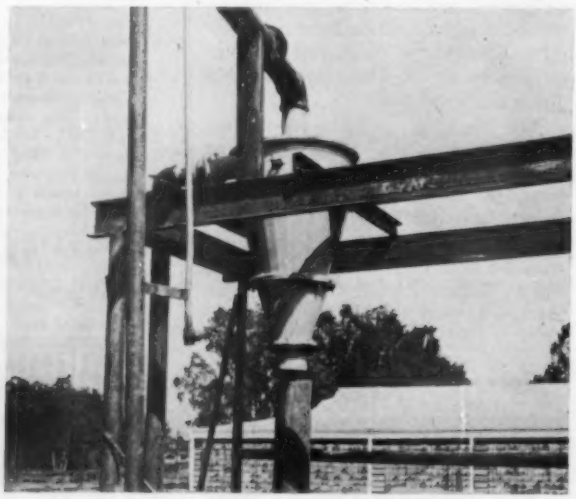
A new concept in clean-sand recovery through the utilization of a small wet cyclone alone, without the use of drags, screw classifiers, and the like, is being currently demonstrated at the plant of the Escondido Sand & Gravel Company, Escondido, Calif.

In the plaster-sand department, a conventional drag was formerly used to process all minus ⅛-in. throughs coming from the washing-and-sizing screen just ahead. Primarily because of the loss of much fine sand the owners, Ed and Bob Martin recently installed a 20-in. H. B. Large Engineering Company Duraclone to refine the full flow of minus ⅛-in. throughput from the screen. Instead of operating the drag as before, the tub is now merely used as a convenient collecting sump for the sand, waste water, clay, etc. This slurry is then pumped at the rate of 500 g.p.m. by a 7½-hp. 3-in. Model X centrifugal pump to the Duraclone, which is mounted overhead; clean sand returns as underflow to a stockpiling conveyor directly below.

Not only is the wet-cyclone method recovering about 18 tons of plaster sand hourly, but tests indicate that 98.7 percent of all the available sand in the slurry is saved by this method. Operating cost is at the minimum also, since the cone has no moving parts; and, being fully rubber-lined, the wear is negligible.



Left: Wet cyclone (upper right) now processes all plaster sand at the Escondido plant.

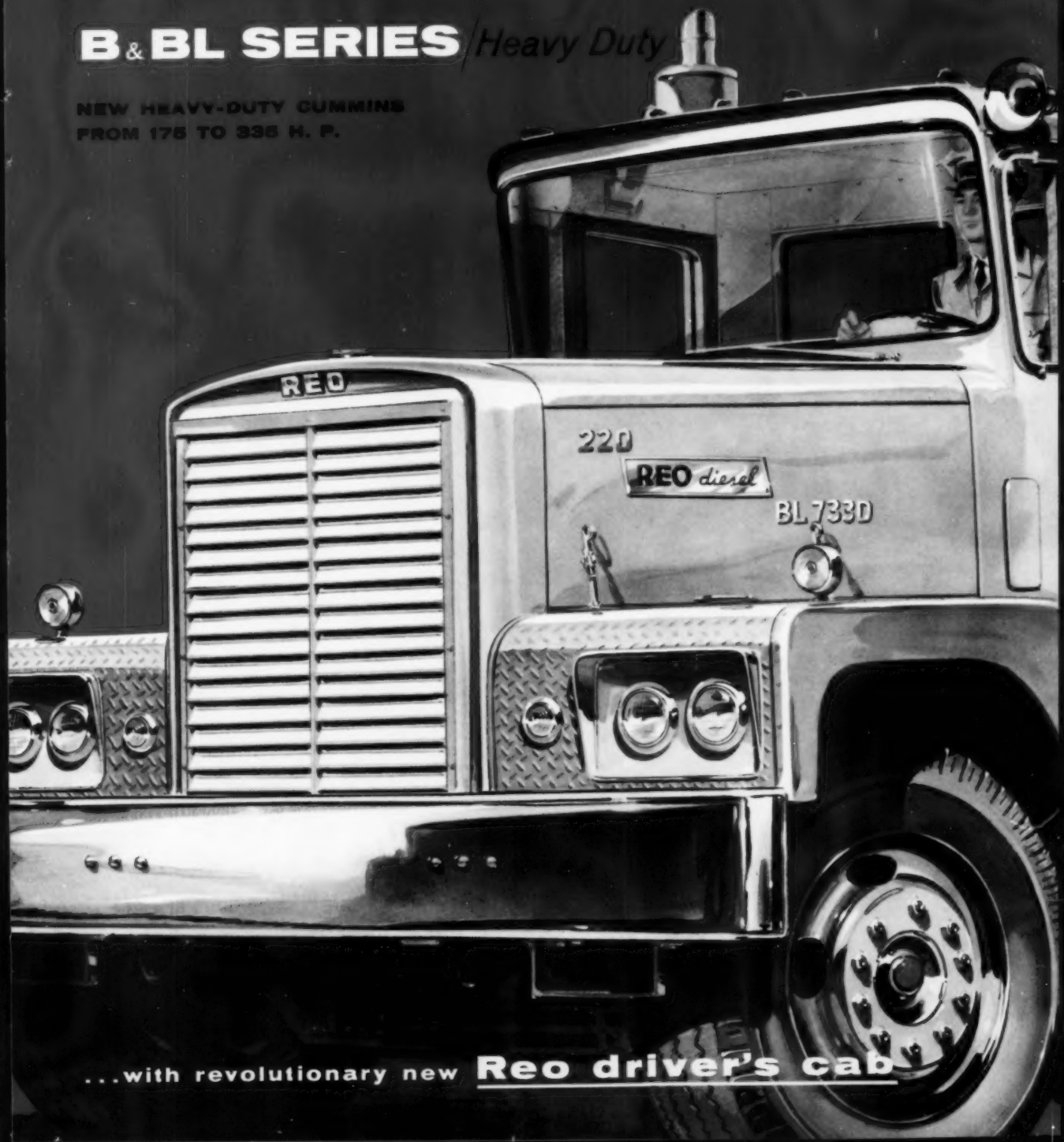


Right: Close-up of the wet-cyclone installation showing feed at upper circumference.

NEW REO DIESELS

B & BL SERIES *Heavy Duty*

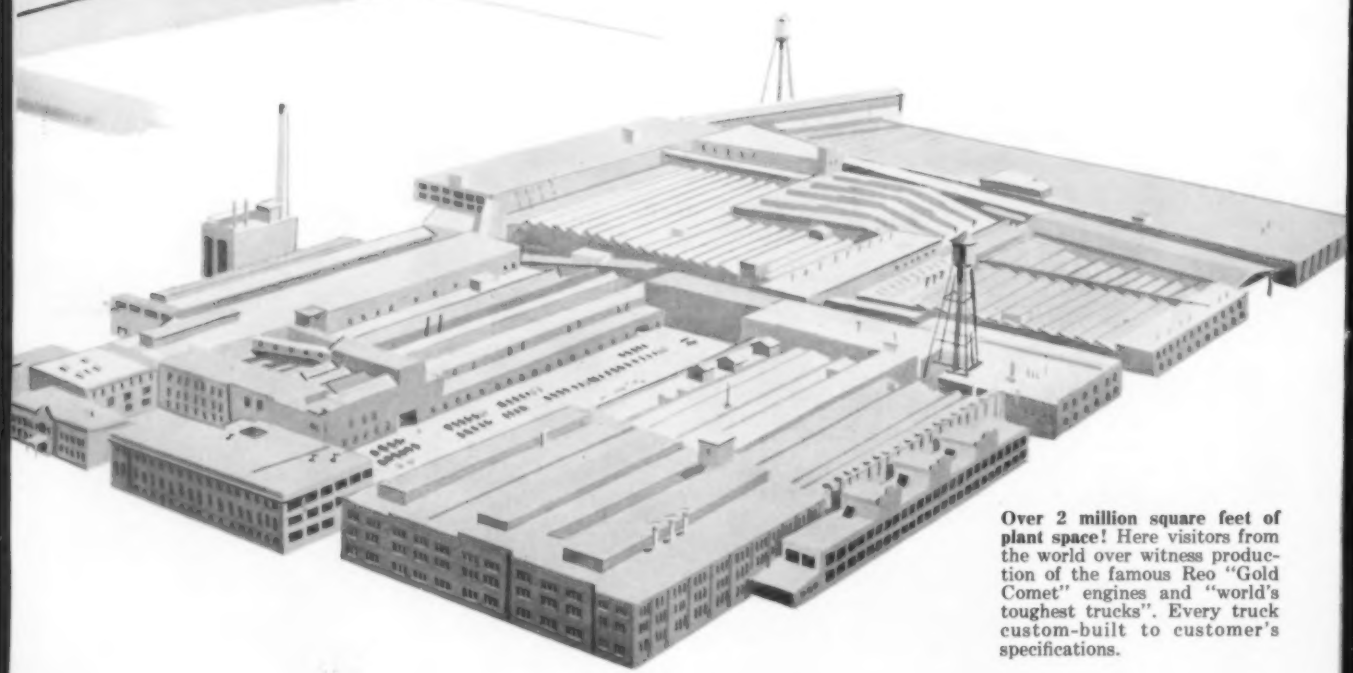
NEW HEAVY-DUTY CUMMINS
FROM 175 TO 335 H. P.



...with revolutionary new **Reo driver's cab**

New slant-back windshield plus overhang provides double-protection from falling debris, snow and ice.

revolutionary



Over 2 million square feet of plant space! Here visitors from the world over witness production of the famous Reo "Gold Comet" engines and "world's toughest trucks". Every truck custom-built to customer's specifications.

New panoramic vision for driver gives him full sweep ahead and on both sides without glare, distortion or obstruction.

New "living room" comfort for driver. Full leg room. No "dog house". Bostrom "Level Ride 80" driver's seat.

New roominess under hood for ease in servicing engine. Husky "Catwalk" fenders, with "diamond" safety treads.

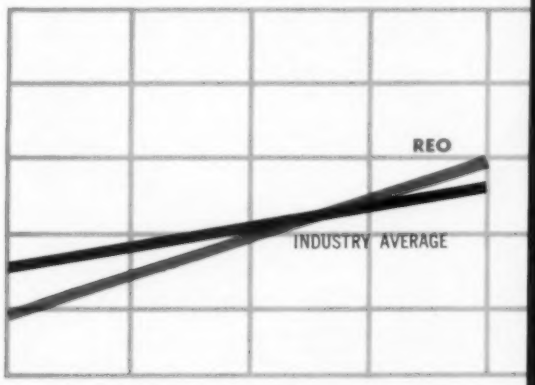
REO DRIVER'S CAB

Reo's New B Series Diesels are brand new. They are the result of extensive research and testing to find the perfect cab for *all drivers* . . . in all operations . . . and under all conditions. They introduce a new concept in driver comfort, convenience and safety —from the Bostrom "Level Ride" seating to the "Panoramic Vision" slopeback windshield . . . from the flat floor and living room spaciousness to the visibility of instruments and convenience of controls.

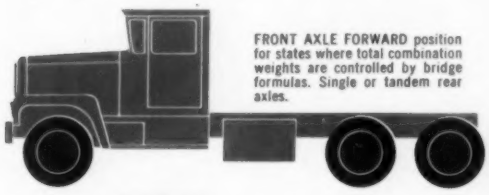
Both four and six wheel tractors and trucks come in all steel or weight reduced aluminum and magnesium. These trucks are especially engineered for economical "Big Load" operations—long-distance highway hauling or tough off-highway service.

Over 8,000 combinations are possible in custom engineering a model to your specific operating requirements . . . using only proven major components from a wide selection.

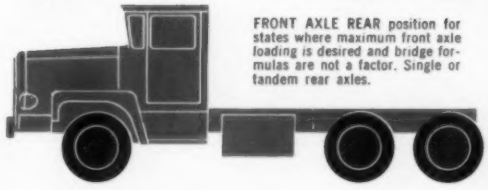
See your Reo Representative or send convenient coupon today.



Reo sales gain in 26,000 lb. and over GVW class exceeds that of the industry during last 2 years. "Heavy" trend is to Reo.



FRONT AXLE FORWARD position for states where total combination weights are controlled by bridge formulas. Single or tandem rear axles.



FRONT AXLE REAR position for states where maximum front axle loading is desired and bridge formulas are not a factor. Single or tandem rear axles.

REO MOTORS, INC.

LANSING 20, MICHIGAN • TORONTO, ONTARIO

SUBSIDIARY OF **BOHN** ALUMINUM AND BRASS CORPORATION

Please send complete information on following new Reo B Series Diesels. ☐ **Standard** ☐ **Lightweight**

NAME

ADDRESS

CITY STATE

TYPE OF OPERATION

Reo has set the

"GOLD STANDARD OF VALUES"

in truck building since the day of the world-famous Reo Speed Wagon

A WORLD WIDE REPUTATION
FOR LEADERSHIP SINCE 1904

- First to standardize on left-hand drive.
- First single plate disc clutch.
- First center-control gear shift.
- First to standardize on electric lighting and starting.
- First with spiral gears on rear axles.
- First to use lightweight alloy pistons.
- First internal expanding 4-wheel hydraulic brakes.
- First self-shifter . . . forerunner of today's automatic transmission.
- First chrome-nickel alloy cylinder blocks.
- First pneumatic-tired truck.
- First to perfect wet-sleeve gasoline truck engine.
- First heavy-duty V-8 truck engines.
- First factory engineered 6 cyl. and V-8 LP-Gas truck engines
- Only truck manufacturer that backs its complete line of Gas and LP-Gas engines with 100,000 mile warranty.

Gold Crown engine built by Reo for its early trucks. Predecessor of Reo Gold Comet.

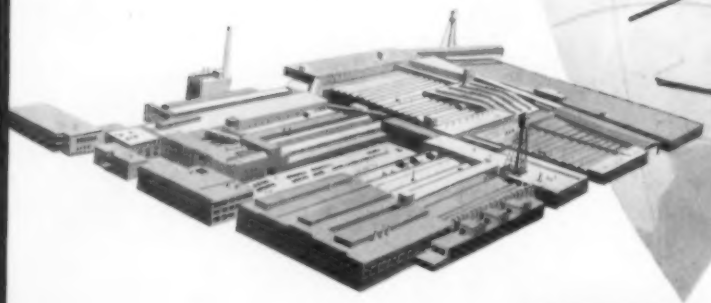
Reo Speed Wagon, introduced in 1915, set new standards in commercial transportation.

Reo Gold Comet "Six" revolutionized the industry with introduction of "wet sleeves".

Reo "Eager Beaver" 2½-ton military vehicle. Over 45,000 produced for the armed forces.

Reo Gold Comet V-8. First heavy-duty V-8 truck engine with modern wet sleeves and short stroke design.

Latest Reo Heavyweight! 470 h.p. twin V-8 engines in 8 x 8 off-highway unit.



REO

BUILDER OF THE "WORLD'S TOUGHEST TRUCKS"

Mex-R-Co Elects Officers; Leach Named President, Arthur, Board Chairman

In a series of personnel changes, the board of directors of the Mexico Refractories Company, Mexico, Mo., elected W. Basil Leach president and

W. Basil Leach

promoted the company's founder, John B. Arthur, from the presidency to the position of chairman of the board and chief executive officer.

Members of the board also announced the election of C. A. Smith, vice-president and chief engineer, to the newly-created position of executive vice-president. Mr. Smith will retain the responsibility of chief engineer.

Carl H. Bachmann, production manager of the Mexico, Mo., plant, and a member of the board of directors since 1955, was elected a vice-president.

Perry S & G Sells Adel Plant, Moves, Expands Perry Facility

The Adel, Iowa, plant of the Perry Sand and Gravel Company, Perry, Iowa, has been sold to the Adel Sand and Gravel Company, a new Dallas County corporation. Perry Sand and Gravel plans to move its Perry operations to a new location near the present plant. This new site has a large deposit of high-quality gravels.

The plant equipment is to be enlarged and modernized with the installation of a hydraulic dredge and additional processing equipment. The expansion will enable the company to produce several sizes of sand and gravel.

"Job Insurance" FOR HEAVY-DUTY HAULING

Marion builds a complete line of underbody hoists (top illustration) and telescopic hoists (bottom illustration); standard, medium and heavy duty dump bodies. The photo shows an MFR 80, 8 cubic yard body with horizontal and vertical side bracing; an HD-10S double arm underbody hoist is used for dumping.

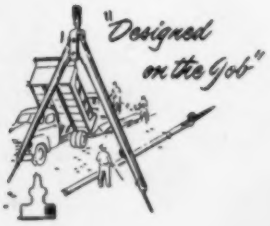
MARION HEAVY-DUTY BODIES AND HOISTS

Marion heavy duty bodies and hoists are designed for performance, dependability and long life to give you the most in results for your money.

First quality materials and workmanship . . . simple design . . . heavy duty construction mean increased payloads with minimum down time. It will pay you to compare! You'll then know why profit-conscious owners all over the world insist on Marions for all types of hauling and dumping operations.

MARION BODIES AND HOISTS

MARION METAL PRODUCTS CO.
MARION, OHIO, U.S.A.



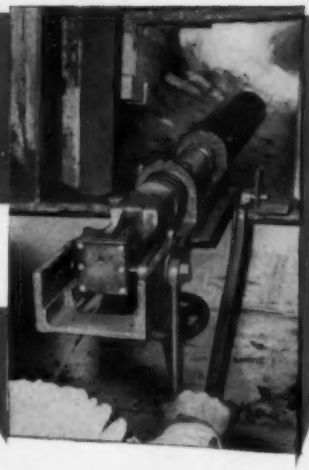
ANNOUNCING

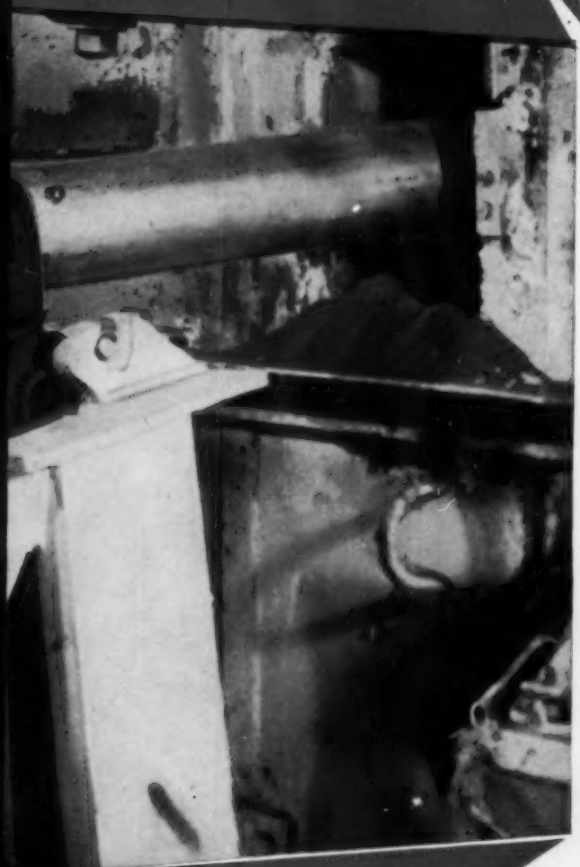
NEW RINGBLASTER

WESTERN INDUSTRIAL SHELLS *FOR MORE ACCURACY AND SMASHING POWER*

Super X ammunition adds 10% to Ringblaster accuracy . . . Super X shells are specially powered to fit the more rugged Ringblaster features. Slugs hit with more impact . . . provide more dislodging action. *Cup-wad* sealing confines release of full power behind slug . . . gives it more knockdown power. Slugs are special alloy to concentrate smashing power and to resist fragmentation.

KILN GUN





Ready now—the newest development in Kiln Guns

Ringblaster MK-I, manufactured by Winchester-Western, is new from action to safety! Breaks out clinker rings quicker than ever . . . cuts down-time losses to a new low. The only kiln gun factory-equipped with a muffler—an exclusive feature which reduces operator fatigue.

This gun is the fastest, and safest way to remove clinker rings and other obstructions from rotary kilns.

EXCLUSIVE ***NEW*** MUFFLER*—Compact! Proved in sound tests! Cuts firing noise to an amazingly low level. So compact it won't block kiln doors or impair aim.

NEW—**Rapid-Fire Martini action** features short stroke actuating lever. Now you can pump out shots at "pom-pom" speed.

NEW—**Barrel is two inches longer,** with a wall 75% thicker. The heaviest and safest barrel mounted on any kiln gun.

NEW—Stronger recoil and rebound springs absorb shock better . . . reduce recoil, help maintain bull's-eye accuracy. All recoiling parts are now enclosed for operator protection.

Fire this good-looking kiln gun. Convince yourself of Ringblaster's fast, smooth action. See how much quicker you can pulverize clinker rings . . . and do it safely!

Write for details.

*Patent pending

Ramset® Fastening System
WINCHESTER-WESTERN DIVISION
OLIN MATHIESON CHEMICAL CORPORATION
12175-F Berea Road • Cleveland 11, Ohio

A. K. Frolich of Ash Grove Retires After 33 Years—Lundteigen Is Successor

A. K. Frolich, vice-president and chief engineer of the Ash Grove Lime & Portland Cement Company, Kansas City, Mo., retired on March 31 after 33 years of service with the firm.

Mr. Frolich, who joined Ash Grove in 1924 as a structural engineer, supervised the construction of the company's Louisville, Nebr., plant in 1927. He served as superintendent of that plant until 1945, when he was made chief engineer, with headquarters in Kansas City.

A graduate of the Thuringian Technical College in Ilmenau, Germany, Mr. Frolich was associated with cement production in Norway before coming to the United States.

A. Lundteigen, Jr., has been named to succeed Mr. Frolich as chief engineer for all plants. Mr. Lundteigen joined Ash Grove as a draftsman at the Louisville plant in 1927 after receiving his degree in mechanical engineering from the

P. L. Wright

University of Michigan. In 1929 he became assistant superintendent, and in 1945 he was promoted to the post of superintendent.

P. L. Wright, formerly assistant superintendent at Louisville, succeeds Mr. Lundteigen as superintendent. Mr. Wright joined the production staff of the Ash Grove plant in Chanute, Kans., in 1927 and was later transferred to Louisville. He has served as assistant superintendent since 1945.

In the shift of administrative positions, Graham D. Jones was appointed to succeed Mr. Wright. Prior to joining Ash Grove in 1952,

A. K. Frolich

LIFTS HIGHEST
LIFTS MOST
COSTS LESS

Points of SUPERIORity

1. New higher pivot position means higher lift, greater reach. Reinforced box-section steel lift arms.

2. Tubular steel frame strongest weight-for-weight, resists stresses from all directions.

3. High pressure hydraulic system with front-mounted pump. Frame acts as hydraulic reservoir.

HEAVY DUTY TRACTOR-MOUNTED LOADERS which make light of yard materials handling. Lift to full height in 5½ sec. 10° bucket tilt-back insures heaped loads, every time. Full range of industrial buckets and crane boom attachment available.

The ½ cu. yd. capacity (2070 lb.) of the Superior Loader releases your heavier equipment for more important jobs. Superbly engineered, made of the finest materials, Superior Loaders are the answer to many yard handling problems. Write for full details—now!

SUPERIOR

SUPERIOR EQUIPMENT DIVISION

P.O. BOX 341, Wheeling 8, Illinois

A. Lundteigen Jr.

Mr. Jones, a registered engineer, worked in the construction field and was associated with a firm of consulting engineers.

Robert Lockwood, Hal Hunt Receive A.S.C.E. Promotions

Officials of the American Society of Civil Engineers have announced the promotion of Robert K. Lockwood to the position of assistant to the executive secretary. He was formerly executive editor of the society's official magazine, *Civil Engineering*.

Mr. Lockwood, who joined the A.S.C.E. staff in 1948, will be responsible for coordinating the society's activities in the Department of Conditions of Practice.

Hal W. Hunt has been named to succeed Mr. Lockwood as executive editor of *Civil Engineering*. Active for many years in the A.S.C.E. construction division, Mr. Hunt has served as program committee chairman and secretary. As a civil engineering graduate, he has had wide experience in the construction field.

At the annual meeting of stockholders of the Ideal Cement Company, Denver, Colo., all directors were re-elected. They include C. K. Boettcher, Charles Boettcher II, Cris Dobbins, C. B. Flick, A. E. Humphreys, M. O. Matthews, and Henry C. Van Schaack, all of Denver; Benjamin R. Boutell, Bay City, Mich.; J. H. Colton, Reno, Nev.; Adolph Coors, Golden, Colo.; D. J. McGanney and Marshall P. Madison, San Francisco; and Norman G. Nicholson, Mobile, Ala.

Del Monte Properties Co. Opens Sand Plant in Idaho

A sand plant opened by Del Monte Properties Company in Idaho will add several years to the operation of the company's plant near Pacific Grove, Calif., according to S. F. B. Morse, company president.

The new plant is at Emmett, where the company has acquired what is described as "probably the largest body of high-silicon glass sand in the western United States."

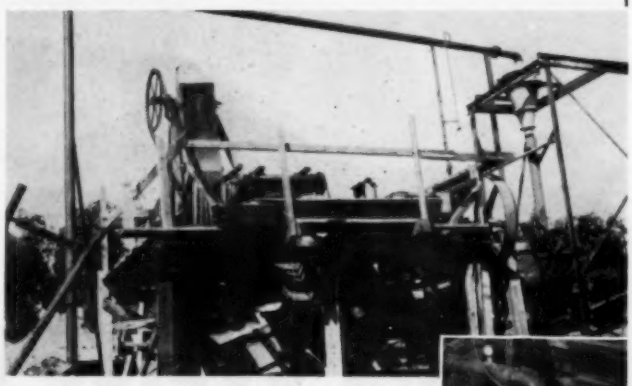
The plant has been in operation for about seven months, providing sand mainly for low-grade uses. The new operation makes it possible for the Pacific Grove plant to reserve most of its sand for fine grade uses, thus permitting it to remain in operation for another 15 years, instead of the 5 years predicted.

Canada Cement plans to spend approximately $8,000,000 to complete capital projects during 1957. In 1955-56 almost $38,500,000 was spent on the current expansion program, which started in 1955 and is now nearing completion.

WILLIAM T. BARRON has been appointed superintendent of the Northampton, Pa., plant of the Dragon Cement Company, Inc., New York, N. Y.

98.7% Recovery of Useful Material at Escondido as . . .

DURACLONE Eliminates Need for SAND WASHER



● **Normally, DURACLONE wet-cyclones are used to recover fine sands otherwise lost from washer wastes. In the plaster-sand department of the Escondido Sand & Gravel Co., Escondido, Calif., however, a recently-installed 20-in. DURACLONE has eliminated the need for the old sand drag entirely. All minus-⅛-inch screen throughs are now processed exclusively by the DURACLONE in the production of plaster sand.**

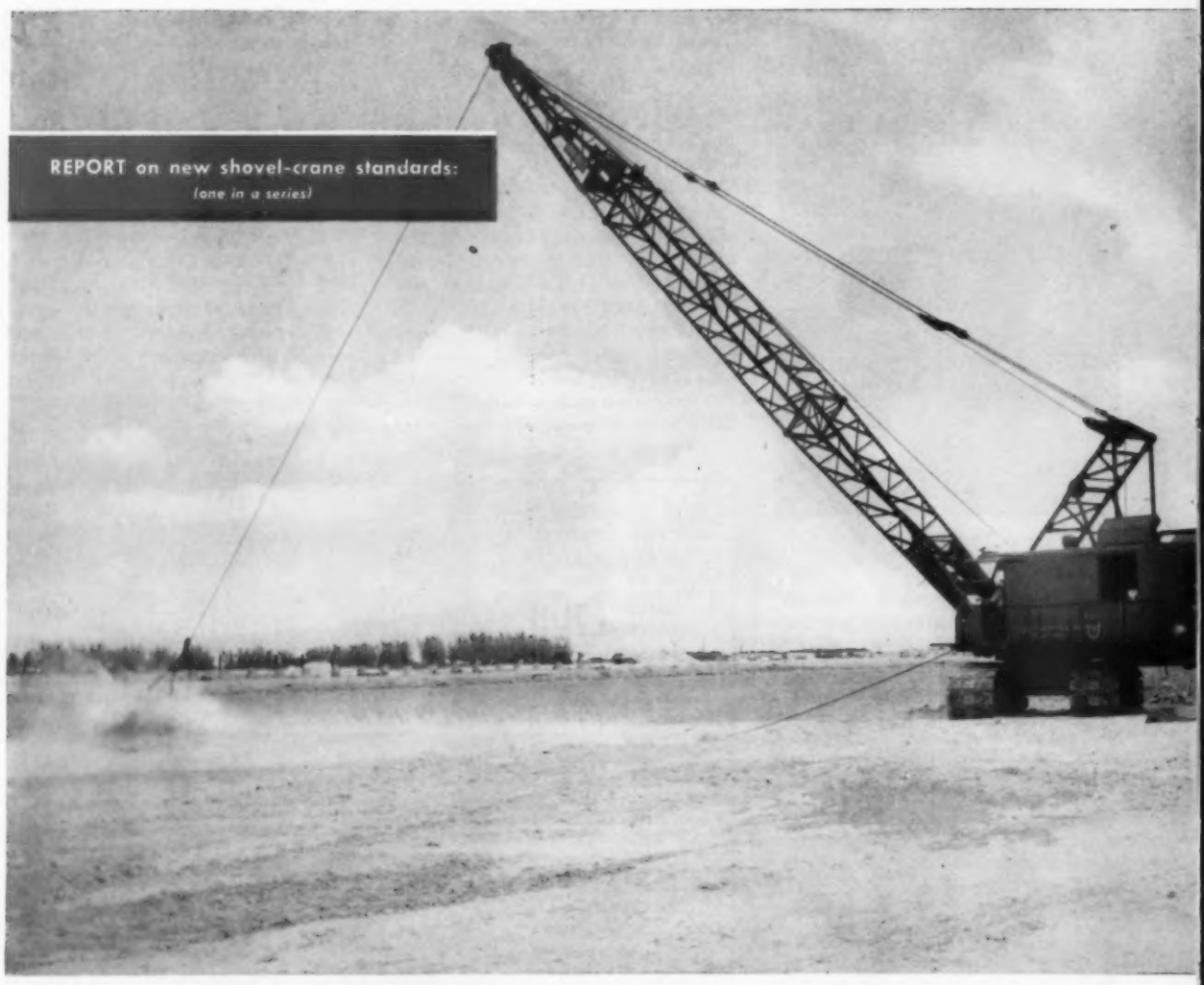
● **With product recovery of 18 tons per hour of clean sand, tests show that 98.7% of *all total available sand is recovered!* With the old washer now inoperative, the lower end of the tub now merely serves as a sump from which a 7½-HP, 3-in. Model X pump raises the raw slurry to the DURACLONE overhead.**

● **This is a remarkable tribute to the ability of DURACLONE to extract *all* fine sand from the plant through-put by centrifugal action alone. Available in diameters to 45-in., DURACLONES are completely rubber lined, and sold on a guaranteed performance basis.**

● ***For complete information,* advise g.p.m. to be handled, and *write, wire, or phone:***

H. B. LARGE ENGINEERING CO.

262 S. Parkwood Ave., Pasadena, Calif. Phone SYcamore 2-7820



Upping cycles per shift with

Standard on every Link-Belt Speeder, Speed-o-Matic fingertip controls minimize operator fatigue. Response is fast, positive, precise

Exclusive with Link-Belt Speeder, this true power hydraulic control system utilizes oil under pressure. An engine-driven pump supplies pressure to put the machine through its paces at the flick of the operator's wrist. Result—he's not subject to costly end-of-the-shift letdown... he stays fresh, works at high speed *all* shift.

Hydraulic-actuated clutches . . .

engage smoothly, surely . . . eliminate jerk, jump or lag. There's perfect feel of the load for high-speed with safety and accuracy. Self-compensating for heat and normal lining wear, the clutches eliminate frequent stops for clutch adjustments . . . convert downtime into productive time.

Advanced design throughout

When you put a Link-Belt Speeder on your job, you get a machine that's years ahead of the field . . . a machine tops in production profit, unusually low in maintenance and service costs. See how you, too, can set new high standards of shovel-crane performance, earn bigger return on your equipment investment. See or call your Link-Belt Speeder distributor for the complete story or write: Link-Belt Speeder Corporation, Cedar Rapids, Iowa. 14,328

High speed stockpiling

Three yard dragline at left features exclusive Speed-o-Matic controls as standard equipment. System utilizes oil under pressure maintained by engine-driven pump through variable pressure valves, transmits pressure through oil directly to the hydraulic-actuated clutches. Engagement is smooth, precise. Operator has perfect feel of the load for effective work even when the bucket's under water.

More usable horsepower

Size for size, Link-Belt Speeder shovel-cranes utilize more of the engines' available horsepower. This bonus pays off in added power at the bucket teeth, greater line pull plus extra power to swing, hoist and travel. Although it gets more usable power and line pull out of the same engines used in other shovel-cranes, a Link-Belt Speeder remains well within the engine manufacturers' recommended operating speeds.

power hydraulic controls

Self-compensating clutches

Hydraulic-actuated pistons automatically adjust for heat and normal lining wear. Hydraulic pressure is unaffected regardless of the distance the piston moves to engage clutch.

Adds an hour's output per shift! Independent-Swing-and-Travel, available on 11 models, eliminates shifting, saves 20-30 seconds each machine move. All operations are completely independent of each other.

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

Drivers last longer...

when heavy-duty trucks use J-M Brake Blocks

• Johns-Manville Brake Blocks deliver the safe, dependable performance that frees your drivers from worry about personal danger. And remember, it's much easier to replace linings than good operators. You get more out of your equipment too, in terms of working time and "pay loads" handled.

That's because these rugged, durable J-M Brake Blocks are engineered for the job . . . and designed for outstanding performance plus maximum service life on trucks, shovels and heavy machinery.

Johns-Manville makes a wide range of industrial friction materials such as linings, facings, cones and segments that are "original parts" on many famous makes of heavy-duty units. For fast, easy replacement, they are available in Johns-Manville Assembled Sets that assure greatest safety in your equipment.

See your Johns-Manville Distributor for data on J-M Brake Linings and Clutch Facings for industrial equipment, or write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario. Ask for booklet FM-35A

Johns-Manville
INDUSTRIAL FRICTION MATERIALS

Basic Div. Honors Davis, N. Y. Coal Board Chairman, At Dedication of Bridge

Edwin H. Davis, chairman of the board of the New York Coal Company, Columbus, Ohio, was honored on May 1 when a suspension bridge, constructed by the Basic Construction Materials Division of New York Coal at Chillicothe, Ohio, was dedicated in his name. The honor commemorates 50 years with the company. Mr. Davis joined New York Coal Co. on May 1, 1907.

The bridge, spanning the Scioto River, is part of a half-mile conveyor system being installed by the Basic Division to facilitate the open pit mining and processing of some recently-acquired gravel beds.

Basic Construction maintains sand and gravel, concrete block, and ready-mixed concrete operations at Chillicothe. Other divisions of New York Coal in Ohio include the Highland Stone Division at Hillsboro, which handles crushed stone and ready-mixed concrete; the Plum Run Stone Division at Peebles; and the General Materials Division at Springfield.

The firm processes more than 1,000,000 tons of crushed stone and gravel aggregate per year. In 1956 the company produced 200,000 cu. yd. of ready-mixed concrete.

Colorado Plant Operators Affiliates of Uranium Firm

Gerald P. Wagner, Oliver Lecompte and Raymond L. Daniels, owners of Transit Mix Concrete Company and Daniels Sand Company, both of Colorado Springs, Colo., have announced recent affiliation with Continental Uranium, Inc. The Colorado men said they would remain as managers of their two firms.

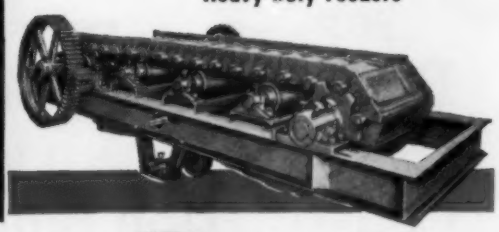
According to Gerald Gidwitz of Continental, the affiliation will enable the firms to expand their activities along similar lines in the building materials field with the added financial resources of Continental. The latter's policy of diversification prompted the move to enter the building materials field and nonmetallic mining.

Consolidated sales of the Minnesota Mining & Manufacturing Company amounted to $330,807,692 in 1956, an increase of $48,946,975, or 17 percent, over the 1955 volume of $281,860,717. Net income after taxes and preferred dividends was $38,437,684, compared with $34,323,370 in 1955.

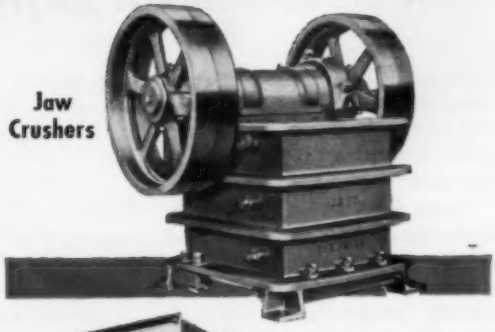
TELSMITH

feeding
coarse crushing
screening
fine crushing
scrubbing

EQUIPMENT
FOR AGGREGATE

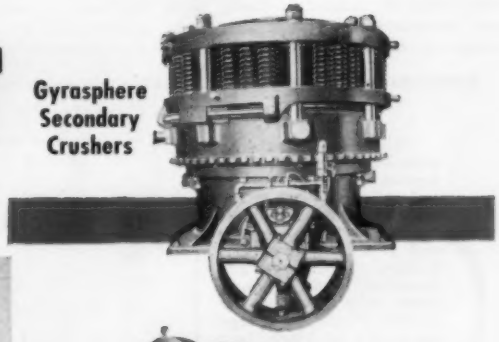


Heavy-Duty Feeders

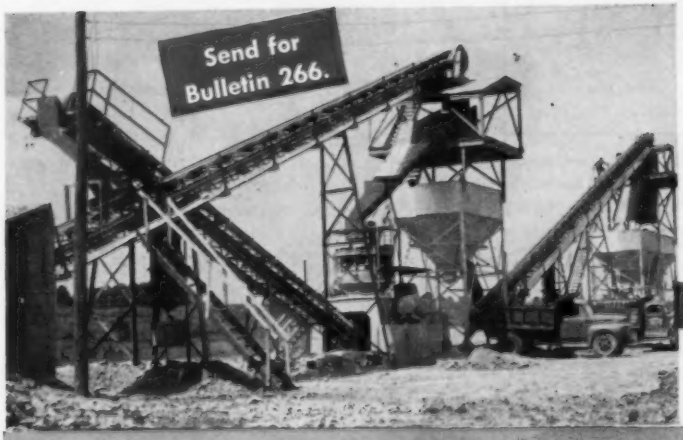


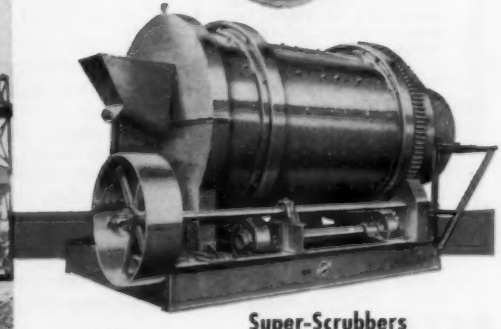
Jaw Crushers

Vibrating Screens



Gyrasphere Secondary Crushers





Super-Scrubbers

E-16

SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Songworks, Milwaukee

TRU-LAY *flexible* PUSH-PULLS

FOR

Remote Control Jobs on a great variety of Construction Equipment

Adaptability to all sorts of mechanical situations explains, in large measure, the wide-spread use of TRU-LAY PUSH-PULLS on tractors and their accessories, power shovels, winches, road graders, road oilers, dump trucks, snow plows, engine-driven pumps, rock crushers and other construction equipment.

These dependable Push-Pulls are used for the remote control of hydraulic and air valves, brakes, clutches, transmissions, throttles, chokes, governors, power take-offs, and many other applications.

TRU-LAY PUSH-PULLS are precision products, not gadgets. They provide positive remote-action whether anchorages are fixed or movable . . . for light loads or loads up to 1,000 lbs. . . . and they are effective over short or long distances, up to 150 feet or more.

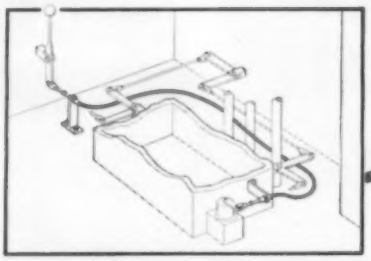
TRU-LAY PUSH-PULLS are dependable and accurate even under the most adverse conditions

They perform effectively under extremes of heat or cold . . . from jet engine temperatures to 70° below zero F. The inner, working member (lubricated for life during assembly) is fully protected by the tough, flexible conduit. Abrasive dusts, dirt and moisture are sealed out. Fittings are cold-swaged to make them integral parts of the control unit. It is a matter of record that we have never heard of a TRU-LAY *flexible* PUSH-PULL wearing out in normal service. Use of these versatile, simple and rugged controls increases ease of operation and means the virtual elimination of maintenance.

Advantages of Tru-Lay Push-Pull flexibility and simplicity are pictured below

Simplicity vs Complexity

Compare the TRU-LAY PUSH-PULL cable in illustration with the mechanical linkage. PUSH-PULLS are simple, have but one moving part, are noiseless and give lifetime service accuracy. Linkages are complex, made of many parts; they wear at many points. Their use brings increased backlash, lost accuracy and vibration rattles.



"Solid as a rod but *flexible* as a wire rope" is a good description of TRU-LAY PUSH-PULL REMOTE CONTROLS. This flexibility makes it possible to snake around obstructions . . . permits the ideal arrangement of all control elements . . . greatly simplifies installation of controls by reducing the number of working parts . . . damps out noise and vibration. Versatile, accurate, adaptable, rugged . . . they are the ideal remote controls for construction equipment.

Our **DATA FILE** *will answer your further questions*
Write for a copy without obligation

Push-Pull DATA FILE

ACCO

AUTOMOTIVE and AIRCRAFT DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

601-K Stephenson Bldg., Detroit 2
2216-K South Garfield Ave., Los Angeles 22 • 929-K Connecticut Ave., Bridgeport 2, Conn.

Gypsum, Products Output Reach Record Highs in '55

According to producers' reports to the U. S. Bureau of Mines, the gypsum industry established a new high in 1955 for the output of crude gypsum and many of its manufactured products. Increased use of wallboard as a construction material was reflected in a 22 percent advance in production and an increase in a total value of $26,900,000 over the previous year. Of all the gypsum products marketed, only plaster, sheathing, and laminated board declined in use during the year. Continuing the trend established in 1952, sanded plaster 46 percent over 1954.

Production of crude gypsum from mines in the United States totaled 10,700,000 tons in 1955, an increase of 1,700,000 tons over the previous record production of 9,000,000 tons established in 1954. Tonnage-wise this represents the greatest net gain in output in a single year since 1946 when the increase totaled 1,800,000 tons. Compared to 1954 increased tonnages were mined in all states except Washington despite the loss of six active mines. Mining was discontinued at 4 mines in California and one each in the states of Colorado, Nevada, New Mexico, and Wyoming, while two new properties were being opened in Indiana.

Fifty plants, with 248 pieces of calcining equipment, produced a record tonnage of 8,800,000 short tons of calcined gypsum during 1955, 16 percent more than the previous year.

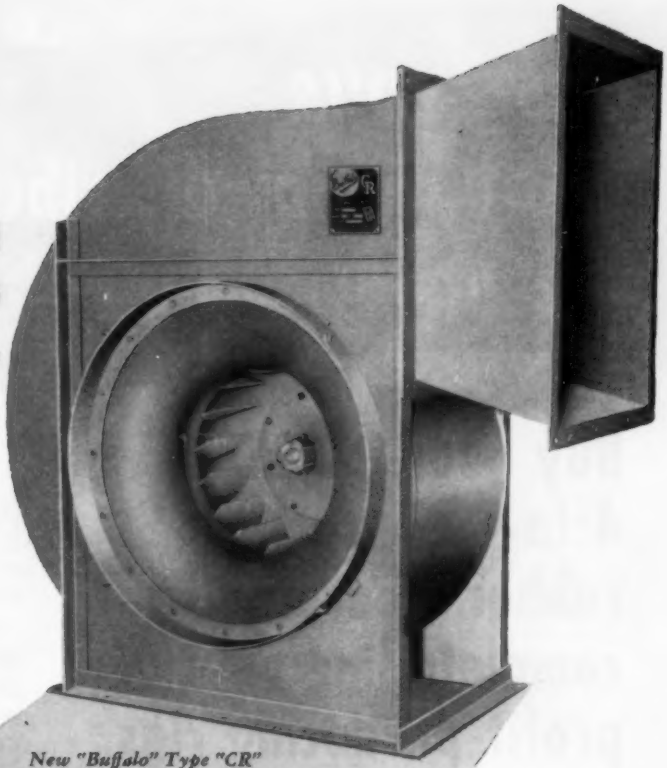
Producers reported stocks of crude gypsum totaling 1,894,000 short tons on hand December 31, 1955, compared with 1,664,000 tons on the same date of the previous year and 1,529,000 tons at the end of 1953.

The average value of crude gypsum mined in the United States was $3.18 per ton compared with $3.04 in 1954 and $2.79 in 1953.

Imports of crude gypsum into the United States increased from 3,400,000 short tons in 1954 to nearly 4,000,000 tons in 1955 or approximately 18 percent. Canada, the principal exporter of crude gypsum to the United States, supplied 88 percent of the total quantity imported and 24 percent of the total consumed. Imports increased from every foreign source with the exception of Jamaica which furnished approximately 61 percent less than in 1954. Crude gypsum imported into the United States from all sources supplied the nation with 27 percent of the domestic requirements.

TO HANDLE HIGH DUST LOADINGS

— at high volume and pressure
— with unusual economy



New "Buffalo" Type "CR" Radial Blade Fan

• MECHANICAL EFFICIENCY above 78% over a broad range

Designed for rugged industrial service, the new "Buffalo" Type "CR" Fan has a highly desirable balance of efficiency and resistance to abrasion. Already proven an economical choice in the cement and steel industries, it has high volume, high pressure characteristics which often permit selection of a smaller fan for lower first cost.

The housing is completely streamlined, from its smooth inlet bell to the gradually diverging outlet — providing maximum static efficiency with reduced housing wear because of the minimized turbulence. The blades are radial at the tip, curving smoothly forward at the inlet to meet the air at the correct angle of attack, further contributing to peak performance with minimum blade wear.

From every standpoint — efficiency over a broad range — long life — freedom from troubles — economy — it will pay you to write for Bulletin FD 205 and investigate these superior new fans.

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Canadian Blower and Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT HEATING EXHAUSTING FORCED DRAFT COOLING PRESSURE BLOWING

ONLY YOUR International distributor can make this deal:

Four-for

Buy your job-sized 4-In-1 on tracks or rubber from a complete line of profit-producing rigs.

Now—why tie-up useful money or "strap" your credit by "over-equipping"? Why spend upwards of four times as much for several limited-duty machines which one 4-In-1 can replace—and outproduce?

An International Drott 4-In-1 gives you 4-machine usefulness for one moderate investment. Yes, the exclusive and revolutionary 4-In-1 gives you instant availability of 4 big-capacity machine actions!

You get world-beating Skid-Shovel excavating-

All-in-1 International Drott 4-In-1

"Carry-type scraper"

with "see-easiness" of front-mounting—to grade, strip, spread, or compact with amazing, inch-close accuracy!

Skid-Shovel...

with Drott's exclusive, "concrete-smashing," triple-power pry-action break-out—and 42° ground-level bucket roll-back!

machine job-capacity One-machine price!

loading performance. You get exclusive multi-purpose "carry-type scraper" action. You get production-boosting clamshell action. You get "radius-controlled" bulldozer action with big-yardage earth-rolling ability!

You get 4-In-1 versatility unlimited for a fraction of the price of the machines it can replace and outperform, on job after profitable job!

And you can have 4-In-1 advantages teamed with all-condition International crawler traction, or rubber-tired Hough Payloader speed!

See your International Distributor—he's the only one who can offer you a 4-In-1 deal! He's the only one who can save you the thousands of dollars that 4-In-1 ownership assures—by giving 4-machine utility for one moderate investment. And he can prove the "heap of difference" in 4-In-1 performance on tracks or rubber—against anything else in the field! See him soon for a demonstration!

gives you...

Clamshell...

that "surrounds" loose materials and fills in one fast gulp—gives you "hopper-high," self-cleanout dumping action.

Bulldozer...

with clam lip up, and skid shoes on the ground, the radius-controlled blade rolls the earth with precision!

ONLY YOUR International distributor CAN OFFER THESE EXCLUSIVE FEATURES!

Here's job-range.

Exclusive triple-power pry-action break-out

Inbuilt ability to deliver tremendous excavating force enables this TD-9 4-In-1 to yank out deeply embedded old masonry piers. You see typical, on-the-job advantages of true and exclusive International Drott pry-over-shoe break-out action—the only design that gives you the three absolute essentials: (1) Full hydraulic power transfer from full piston-face power-push; (2) Long lever to apply full pry-power; (3) Fixed fulcrum of frame-mounted skid-shoes, to concentrate pry-force!

Exclusive parallelogram raise action

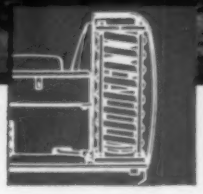
No eccentric tipping to cause spill-back and lose yardage! The 4-In-1 has non-spill, roll-back level—all the way up. Compared to ordinary front-end loader performance, this feature, alone, can increase your daily yardage up to 18%! You can bottom-dump the 4-In-1 as a clamshell...and do it 2½-foot higher than ordinary roll-forward buckets. And bottom dumping eliminates the sticky materials problem—where other rigs foul up and can't get the job done!

Check these other famous International Drott Exclusives!

- **STANDARD EQUIPMENT.** Three-valve design, to provide hydraulic control power for attachments.
- **STANDARD EQUIPMENT.** Double-bottom, bridge-truss bucket to insure 4-In-1 strength to match pry-action.
- **STANDARD EQUIPMENT.** Yoke-type supports to insure linkage strength to back 4-In-1 capacity!
- **STANDARD EQUIPMENT.** Magnetized dip stick to prevent damage to hydraulic system from minute abrasives!

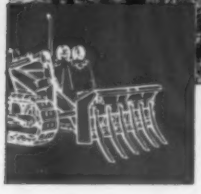
Only your International Distributor can offer you the big money-making advantages of International Drott exclusive 4-In-1 features. Only he can deliver you job versatility unlimited, in the world's only multi-purpose machine of its type! Prove to yourself that your correct size of 4-In-1 can replace and outperform a whole machinery yard full of limited-duty rigs. Ask for a demonstration!

where 4-in-1 gets world-beating . . . capacity . . . stay-put performance!



Exclusive shock-swallowing Hydro-Spring

Capacity-boosting, machine-protecting Hydro-Spring is a hydraulic cylinder enclosed in a heavy-duty locomotive-type coil spring. Shock force displaces oil from main lift cylinders into the Hydro-Spring cylinder—extending it and compressing the big spring to absorb and cushion impact loads. Slamming the 4-In-1 bucket into hard material—'dozing frozen ground—dumping rock with a bang—you never worry! Hydro-Spring gentles trouble-causing forces by two-thirds or more—practically eliminates hydraulic hose failures!



Complete line of attachments

Job-getting, money-making attachments built for specialized duty, provide tree-grubbing, boulder-bucking, log-loading performance available only from International Drott equipment! Grubber Blade attachment, used in place of the 4-In-1, is shown applying the tremendous force of pry-action break-out—to uproot a tough old oak tree. Other special attachments built to extend International Drott advantages to other fields include: Rock Forks, Skid-Grapples®, Bulldozer and Bullangledozer blades!

CHOOSE FROM

four 4-in-1 sizes

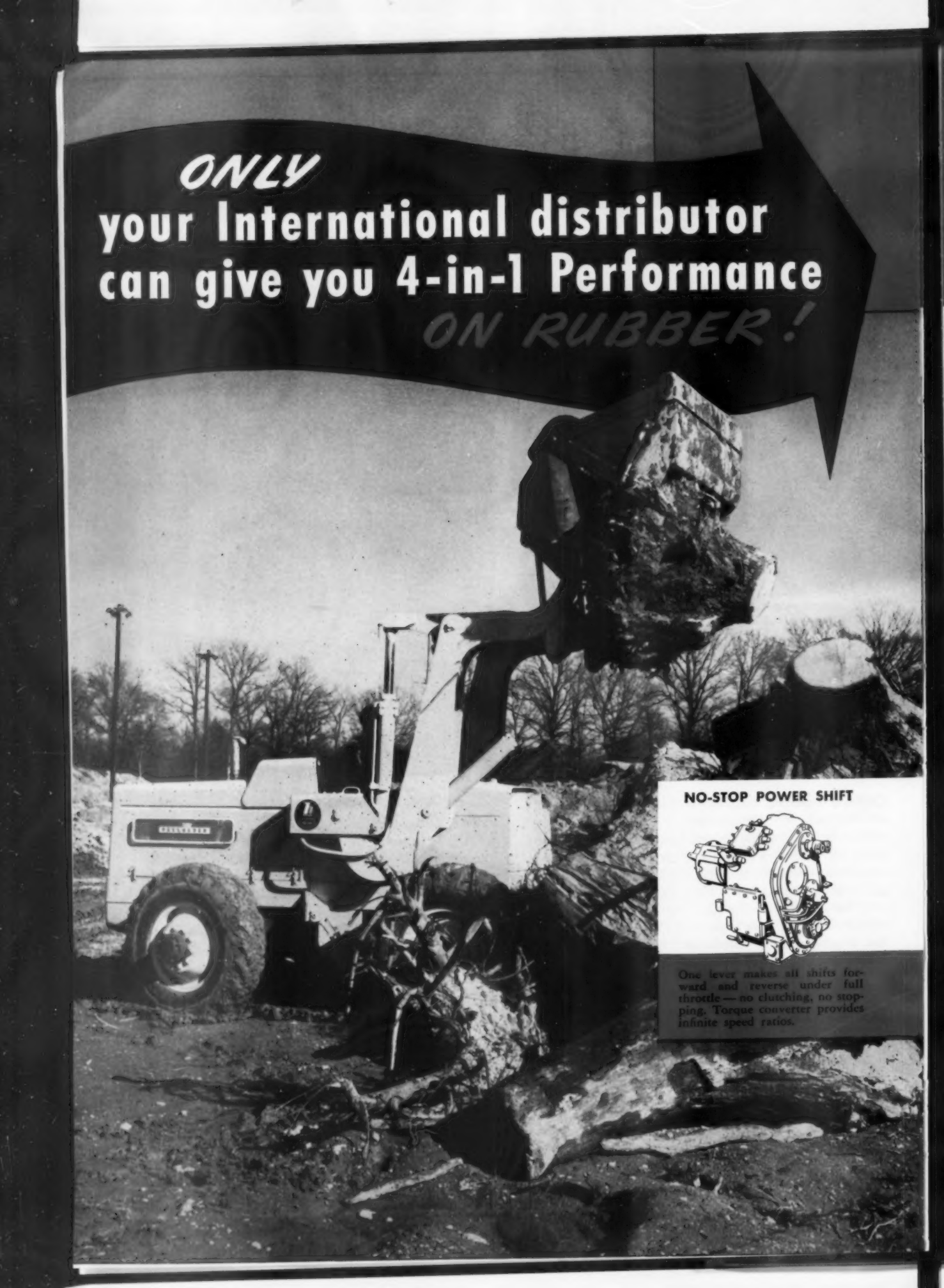
TRACTOR SIZE	4-IN-1 CAPACITY
TD-6	1-YARD
TD-9	1½-YARD
TD-14	2¼-YARD
TD-18	3-YARD

International Harvester Company, 180 N. Michigan Ave., Chicago 1, Ill.
Drott Manufacturing Corp., 3126 South 27th St., Milwaukee 15, Wis.

INTERNATIONAL® DROTT®

ONLY

your International distributor can give you 4-in-1 Performance *ON RUBBER!*



NO-STOP POWER SHIFT

One lever makes all shifts forward and reverse under full throttle — no clutching, no stopping. Torque converter provides infinite speed ratios.

PAYLOADER® mobility

PLUS four-machine utility

The only rubber-tired tractor-shovels available with Drott 4-in-1 buckets

Now you get even more tractor-shovel performance when you buy a "PAYLOADER". Equipped with a Drott 4-in-1 bucket, your "PAYLOADER" can handle many jobs that other wheeled tractor-shovels can't touch . . . perform shovel, clamshell, scraper or bulldozer work that would otherwise require several separate machines.

With a Drott 4-in-1 on a "PAYLOADER" you also get:

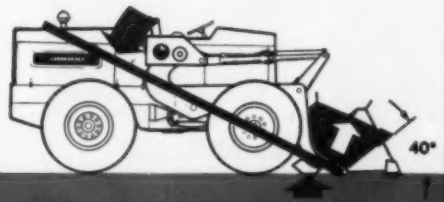
MOBILITY — quick-to-job travel over streets or highways under its own power . . . ability to work on or off paved surfaces.

MANEUVERABILITY — easy operation and fast loading cycles because of responsive rear-wheel power steering, "no-stop" finger-tip power shifting, dependable 4-wheel power brakes.

BALANCE AND STABILITY — long wheelbase . . . hydraulic load-shock-absorber . . . low, close bucket-carry position, all contribute to the easier riding qualities, the higher carrying speeds and the unusual balance that are outstanding "PAYLOADER" operating advantages.

TRACTION AND DIGGING POWER — exclusive power-transfer differentials, planetary final drives and the powerful pry-out bucket digging action help these "PAYLOADER" units to outperform other tractor-shovels of comparable size. Your International Distributor is anxious to demonstrate what these "PAYLOADER" tractor-shovels with a Drott 4-in-1 bucket can do for you. Ask him about the "PAYLOADER" Deferred Payment Plan.

PRY-OUT DIGGING ACTION

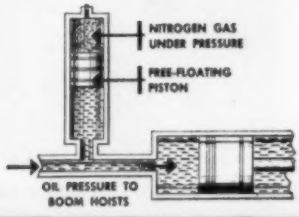


Exclusive "PAYLOADER" bucket action combines a powerful prying force over "break-out" pads, with 40° bucket tip-back *at ground level* to get heaped loads into bucket quickly and easily.

POWER-TRANSFER DIFFERENTIALS

These special differentials give better traction under all conditions — automatically deliver 25% more power to the wheels with the better traction.

LOAD SHOCK ABSORBER



This important device is a part of the hydraulic system. It cushions the loaded bucket, smooths the ride, permits faster carrying speeds, reduces spillage, boosts production.

All three sizes of 4-wheel-drive "PAYLOADER" tractor-shovels, models HU, HH and HO, are available with Drott 4-in-1 buckets, sizes 1, 1½ and 2¼ cu. yd. respectively.

SAY "HUFF"

PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

IH

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" model ( ) with Drott 4-in-1 bucket to:

Name _____

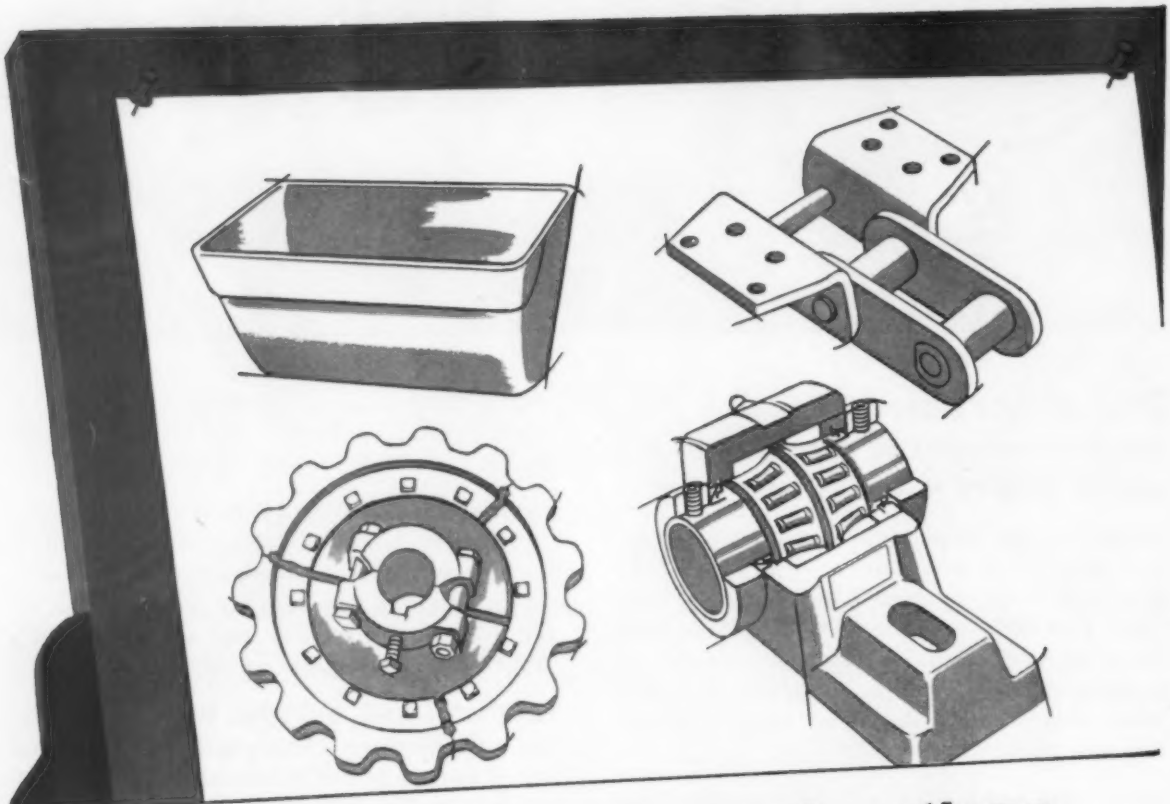
Title _____

Company _____

Street _____

City _____ State _____

90



designed for each other

The bucket, the chain, the sprocket and the bearing are components of a Rex Rated Cement Mill Bucket Elevator. All are built by CHAIN Belt Company. All are engineered out of a half century of CHAIN Belt experience at elevator design and construction.

Each component is designed to complement the design of the others. This balance of engineering objective is the reason for the great operating efficiency and strength and durability of the end product, the Rex Rated Bucket Elevator.

Why not consider these products the next time you plan to replace the components in your present centrifugal elevator.

Write for Bulletins 3304 & 5766; it's about Rex® Rated Centrifugal Discharge Cement Mill Bucket Elevators and their components. CHAIN Belt Company, 4604 West Greenfield Avenue, Milwaukee 1, Wisconsin.

CHAIN BELT COMPANY

Milwaukee 1, Wisconsin

Why carry dead weight?

PAYLOAD PAYS OFF when you haul with a HEIL dump body and hoist

Ideal design of a dump truck body and hoist unit offers maximum strength and durability without payload-robbing excess weight. A Heil *engineered* body and hoist offers important features for money-making performance on any earth-moving or rock-hauling operation. Here's why . . .

HEIL HOISTS ARE *DEPENDABLE*

Sturdy Lift Arm Assembly made from heavy steel plate provides great strength with the least weight. Dirt and stones can't jam powerful lifting action.

Precision Hoist Cylinders are bored and honed to close tolerances. Cylinders are made from high quality seamless steel tubing. Screw-on cylinder heads permit easy access to all parts for simple maintenance or inspection.

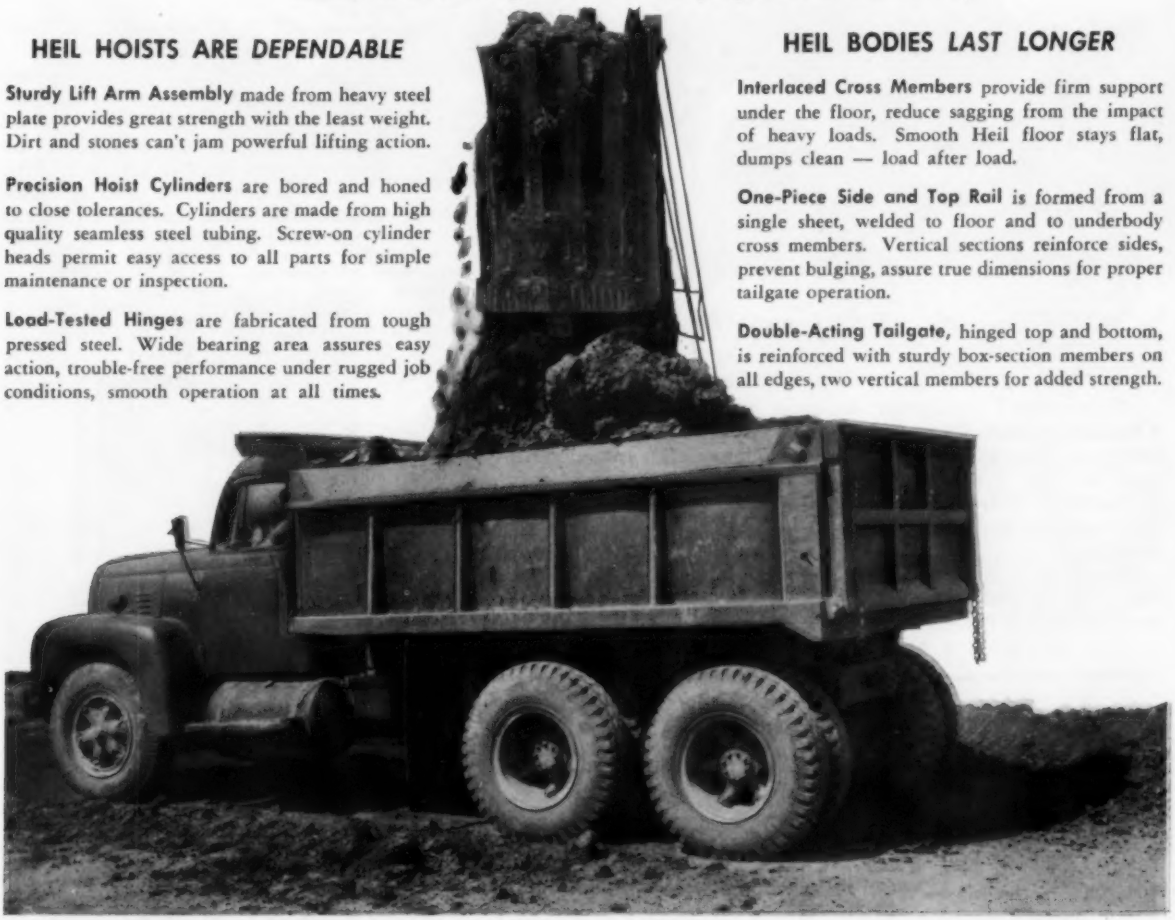
Load-Tested Hinges are fabricated from tough pressed steel. Wide bearing area assures easy action, trouble-free performance under rugged job conditions, smooth operation at all times.

HEIL BODIES *LAST LONGER*

Interlaced Cross Members provide firm support under the floor, reduce sagging from the impact of heavy loads. Smooth Heil floor stays flat, dumps clean — load after load.

One-Piece Side and Top Rail is formed from a single sheet, welded to floor and to underbody cross members. Vertical sections reinforce sides, prevent bulging, assure true dimensions for proper tailgate operation.

Double-Acting Tailgate, hinged top and bottom, is reinforced with sturdy box-section members on all edges, two vertical members for added strength.



Your truck dealer will get expert help from the Heil distributor in working out the correct specifications — overhang, axle loading, capacity — assuring maximum legal payload for your area.

You'll get faster delivery of your new truck because the local Heil distributor can provide immediate mounting service on the equipment you need — right from stock.

What's more, if you should need parts or repairs on your Heil unit, your truck dealer has ready access to the distributor's complete facilities to give you prompt service.

Next time you're ready for a new dump truck, ask your dealer about a Heil body and hoist — a quality feature on the finest truck you can buy. THE HEIL CO., MILWAUKEE 1, WIS.

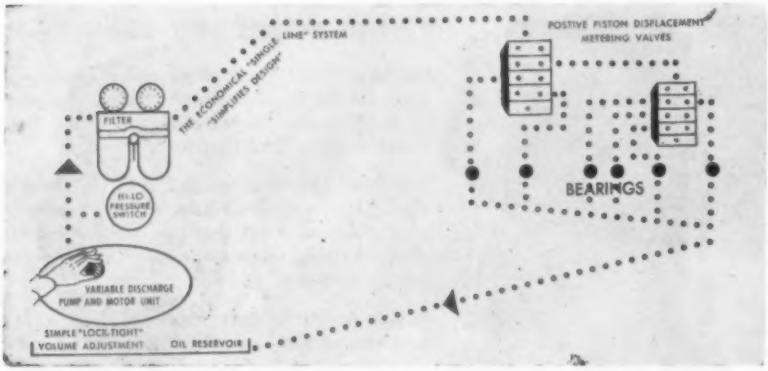
HEIL

MILWAUKEE 1, WISCONSIN

DUMP BODIES and HOISTS

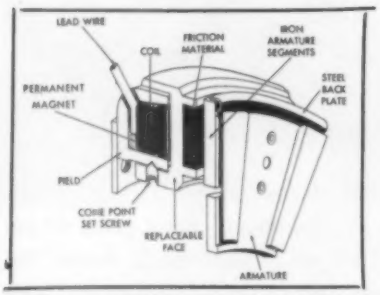
New Machinery
and Equipment

For Further Information Use Card on Pages 133-134



• Mark II, a new "Meterflo" circulating oil lubrication system developed by The Trabon Engineering Corporation, accurately proportions oil to any number of bearings on a machine.

The system includes a variable discharge pump and motor unit. Adjustable volume control is available in two ranges to meet various machine design and oil viscosity requirements—from 5 to 30 and from 16 to 100 cu. in./min. The heart of the system is the feeder or distributor valves. The progressive action of the pistons within these feeders guarantees a pre-determined measured flow of oil to each bearing. **(51)**



• Designated "Power-Safe" brakes, a new line of brakes offered by the Warner Electric Brake & Clutch Company combines high torque and fast cycling with the ability to hold or stop a load if power fails. Four models are currently available—the PER-825, 1000, 1225, and 1525. Power torque ratings range from 125 to 650 lb. ft., and fail-safe torque ratings range from 33 to 205 lb. ft.

The brake consists of a stationary field, replaceable face, and armature. A ring of permanent magnets imbedded in the face of the field provides the fail-safe feature that holds the brake in position with power turned off or power-failure. The wound coil located in the field also produces magnetic lines of force. **(52)**

• A new repair link for hoist and drag chains has been developed by Kensington Steel, Division of Poor & Company. Available in sizes from 1 in. to 3 in., the Kensington repair links will fit all standard cast manganese drag and hoist chains.

The "missing link" consists of two identical half links and a combination key and wedge. The half links are inserted through the ends of the chain to be joined; then when the wedge is driven into place, it automatically bends the key and locks the link together. **(53)**

• Model MD-Jr, a compact operations recorder available from Gorrell & Gorrell, records graphically when a machine or device is operating or when an operator is producing. The MD-Jr consists of a drum which rotates at speeds from 4 minutes to 24 hours per turn.

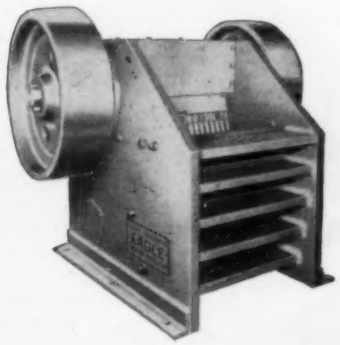
The pressure of a stylus which rests against the chart paper produces a slight spiral tracing. A lead screw, subject to an axial motion from the magnet responding to the input signal, causes the vertical line. By this means, more than 400 linear inches of clear recording may be obtained on the waterproof 6- by 14-in. chart.

Drum speeds range from 4 minutes to 24 hours per revolution. Motors operate on 115 or 220-v. a.c. The clear, transparent cover prevents tampering, keeps out dust, and allows the record to be seen. **(54)**

PRODUCE MORE STONE AND GRAVEL WITH MOBILE

Eagle Crushers

Portable Eagle crushing plant operated by Harry Miller Contracting Co., Suffield, Ohio, delivers pit run sand and gravel at rate of 100-125 yds. per hour for cushioning concrete super-highway nearby. Whole layout can be moved as gravel is consumed. (Power source is electric generator set—could be gasoline or diesel direct drive.)



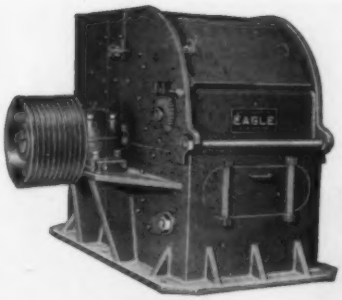
JAW CRUSHERS

Eagle Crushers—both jaw type and hammermill—bear the characteristic marks of the experienced manufacturer—simple design, durable construction, ease of servicing. Eagle originated the one-piece, electrically welded frame—has pioneered in the field of portable, compact, crusher plants like the one above.

There is a range of sizes in the jaw crusher—and a variety of styles (skid-mounted, trailer, portable, roadside). Likewise, the hammermill or impact breaker is made in several sizes and for various applications—is particularly well suited to limestone reduction.

EAGLE
JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS
CRUSHER CO., Inc. GALION OHIO·U·S·A

You are invited to consult our engineers on your crusher problem—no obligation!

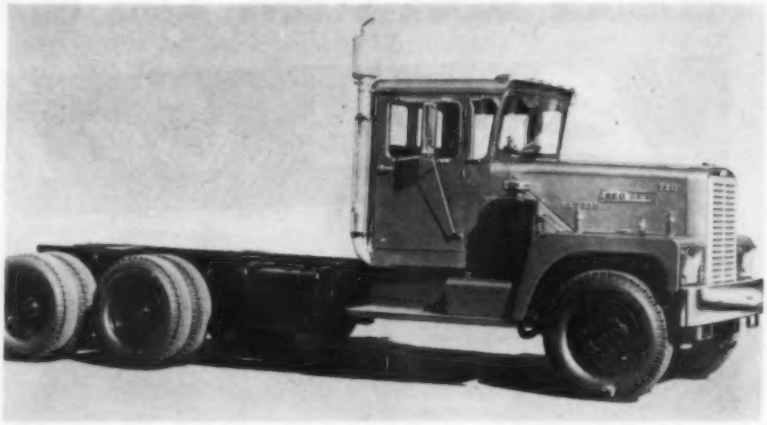


HAMMER-MILLS

• Reo Motors, Inc., has introduced this month the latest addition to its line of heavy-duty vehicles, the B-Series diesels. The B-Series line consists of three 4x2 and four 6x4 trucks; three off-the-highway trucks; and six tractor models. The single axle units are engineered for GVW's to 42,000 lb., and the tandem axle units up to 63,000 lb. The B-Series tractor models are designed for gross combination weights of 65,000 to 85,000 lb.

The flexibility of cab and chassis construction in the B-Series, plus a very wide range of available options, make these units highly suited for big load operations or rugged off-the-highway jobs requiring custom tailored trucks. The driver's cab, with slant-back windshield and full sweep vision, comes in either steel or lightweight aluminum. Both four- and six-wheel chassis models in the B-Series are available in steel or in lightweight versions utilizing many weight reducing aluminum or magnesium components and structural parts.

A choice of nine Cummins heavy-duty diesels is offered in the new series. Horsepower ratings for the available engines range from 175 to 335 hp. All models are standard with front forward axle, or available with front axle rear position.



Reo's new B-Series line of heavy-duty vehicles consists of three 4x2 and four 6x4 trucks, three off-the-highway trucks, and six tractor models.

Driver comfort was a first consideration in the design of the Reo cab. Panoramic vision is achieved through the use of a top-forward windshield which enables the driver to get a full view ahead and on both sides without distortion or obstruction. An overhang above the windshield eliminates glare. Instruments are easily visible and lights are controlled by toggle switches.

Reo has introduced dual headlights on its new B-Series. Twin units are standard equipment; the single lamp system is optional. The twin lamp unit is built encased in a single housing for simplicity of installation or removal. In the event of a burned out filament, individual sealed beams can be replaced.

The twin headlight system provides considerably more seeing distance on lower, or passing beam, without glare to approaching cars.

Ease of servicing the engine in the B-Series was accomplished with a large underhood area and with extra strength "Catwalk" fenders with diamond safety treads. These fenders provide a platform from which the driver or mechanic can quickly and easily get to the engine. Fender levelness permits tools to be within handy reach while servicing. (55)

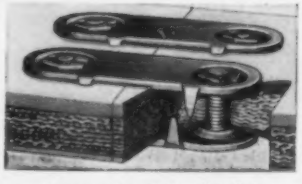
The twin-headlight system, standard on Reo's new heavy-duty B-series diesels, provides more seeing distance on lower beam without glare to approaching cars. The single lamp system is optional.

FLEXCO®

BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-112

FLEXIBLE STEEL LACING CO., 4623 Lexington St., Chicago 44, Ill.

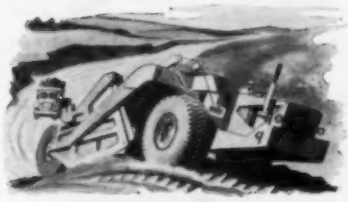
Announcing the all-nylon

B.F.Goodrich

ROCK SERVICE TUBELESS

FOR MINES

QUARRIES



DIRT-MOVING JOBS

FLEX-RITE construction prevents unnecessary tire failures!

THE new B.F.Goodrich Rock Service tire—unlike an ordinary tire—is *built to its inflated shape.* When inflated, the tire body is not distorted. The whole tire flexes evenly, uniformly. No *localized* stresses that often cause unnecessary tire failures. FLEX-RITE construction eliminates this major cause of tire trouble and expense!

New B.F.Goodrich Rock Service tires are built with FLEX-RITE nylon cords. There are no cross threads to rub and chafe, creating tire-killing heat. FLEX-RITE nylon cords withstand double the impact of other materials, resist heat blowouts and flex breaks. Result: more retreadable Rock Service tires.

Greater traction! Puncture protection!

The double chevron tread gives maximum traction and skid resistance in forward or reverse. Rugged sidewalls defy rock bruises. V-shaped grooves expel stones. B.F.Goodrich Tubeless construction runs cooler, protects against punctures, cuts maintenance costs, is easier to service.

See the new, money-saving Rock Service nylon tire at your B.F.Goodrich dealer's today. It's the most advanced tire on the market today built for off-the-road hauling. *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

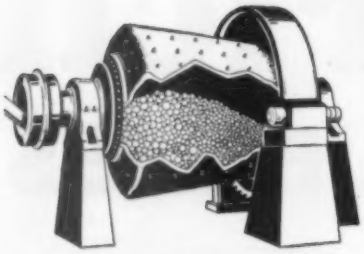
Specify

B.F.Goodrich tires when ordering new equipment

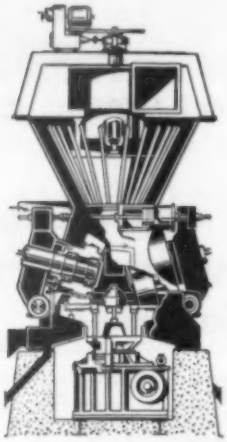
B.F.Goodrich
FIRST IN RUBBER

Your B.F.Goodrich dealer is listed under Tires in the Yellow Pages of your phone book

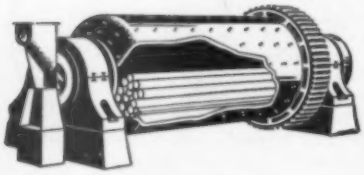
GRINDING MILLS
for every application...



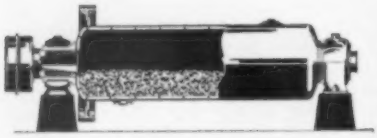
TRICONE and CONICAL MILLS



DISC ROLL MILLS



ROD MILLS



TUBE MILLS

Write for Bulletin AH-474-8

HARDINGE
COMPANY, INCORPORATED
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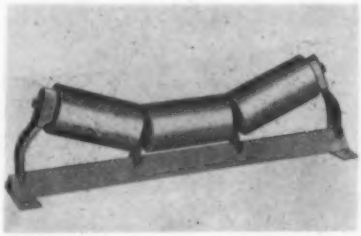
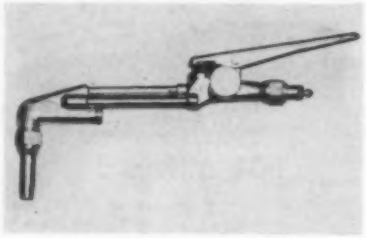


• Marco belt conveyor idlers, manufactured by E. F. Marsh Engineering Company, feature pre-lubricated, permanently sealed, self-aligned ball bearings. The rolls are made of mechanical tubing of uniform wall thickness to insure concentricity, balance, and smooth operation. A formed steel deflector shield prevents the entrance of material between end rolls and brackets. An all-steel, jig-welded supporting frame assures permanent roll alignment. **(56)**

• To meet the demand for a fine material washer-classifier in larger capacity, Eagle Iron Works has introduced a new, large unit in both single and double screw. Screw diameter is 54 in. and tub length is 34 ft. Normal screw speed is 14 r.p.m. Capacity of the single screw is 250 t.p.h., and 500 t.p.h. for the double screw. The single screw weighs 26,000 lb., and the double screw weighs 50,000 lb.

Screw is of the ribbon type, consisting of a sheet steel spiral welded to the shaft with replaceable Ni-Hard chrome-nickel alloy iron shoes on the wearing edge of the screw. The unit features an improved feed box which is designed to reduce turbulence to a minimum in the settling pool area. It flows in material in a flat ribbon below the water line. **(57)**



• The Airco Style 1490, a new light-duty oxyacetylene cutting attachment for the Airco Style 400 lightweight welding torch, is now available from the Air Reduction Sales Company. Cutting range of the Style 1490 is up to one inch thick steel.

The new attachment weighs 13 oz., and is 9½ in. long. A firm gas-tight seal is assured with tapered gas sealing rings, and hand tightening makes a firm joint. A diaphragm-type cutting oxygen valve eliminates the need for valve packing and prevents gas leakage. **(58)**

• Dorsey's new removable gooseneck low bed trailer, available in capacities of 15 to 75 tons, makes one-man loading and unloading of heavy equipment a simple matter. A hydraulic system lowers the front end of the deck to the ground for loading and unloading, and lifts it back into running position. The deck can also be lowered and raised 2 in. from standard position for extra ground and overhead clearance. **(59)**

CLAMSHELLS. For all-purpose digging and materials rehandling. Two through six part reeving permits wide range of closing power and speeds. Equipped with ESCO Two-Piece Teeth for faster handling of compacted materials.

NO DIGGING PROBLEM TOO TOUGH FOR ESCO BUCKET SPECIALISTS

DIPPERS. For any stick connection. General purpose, Heavy-Duty, Coal Loader, Mesabi Type—to your specifications, your job requirements.

DRAGLINES. Featherweight, Medium-Weight, Heavy-Duty, Extra Heavy-Duty and Tapered for any excavating or loading job.

ORANGE PEELS. Full leaf, semi-leaf, and digging leaf, three-point grip for fast, efficient handling of rip-rap, boulders, stumps, logs and scrap.

HOES. FASTBACK® design eliminates drag and heeling action in trenching and back filling jobs. Sixteen lip widths. Cutting widths from 20″ to 62″. Digs equally well with or without side-cutters.

Draglines, dippers, hoes, clams, orange peels—*ESCO* builds them all to handle your toughest digging requirements. Drawing upon years of design and fabrication experience, *ESCO* engineers can build a bucket for your job that will:

INCREASE YARDAGE: *ESCO* Buckets are job-tailored... to solve your specific digging problems.

CUT COSTS: Critical wear points are alloy steel castings. High strength-weight ratios are achieved through all-welded construction. *ESCO* buckets are available with *ESCO* quick-change two-piece teeth. Seven different point shapes for faster digging.

See your nearest ESCO dealer or write direct.

ELECTRIC STEEL FOUNDRY COMPANY
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MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
Offices in Most Principal Cities
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IN CANADA ESCO LIMITED

PEAK CAPACITY

with

KENNEDY EQUIPMENT

NEW BRAUNFELS, TEXAS,
LIME PLANT
UNITED STATES GYPSUM
COMPANY

General View of Plant Showing KVS 10′ x 150′ Kiln with Preheater Internal Recuperator and Preheater

KENNEDY PRODUCTS

- Gyratory Crushers
- Swing Jaw Crushers
- Tube Mills
- Ball & Rod Mills
- Vibrating Screens
- Rock Feeders
- Air Swept Tube Mills
- Rotary Kilns
- Coolers, Dryers
- Preheaters, Deheaters
- Belts, Conveyors
- Pneumatic Transport Systems
- Asbestos Plants
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Send for bulletin describing KVS Machinery and Equipment

KENNEDY-VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

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OF LIME PER DAY

...for New Braunfels, Texas plant of United States Gypsum Company

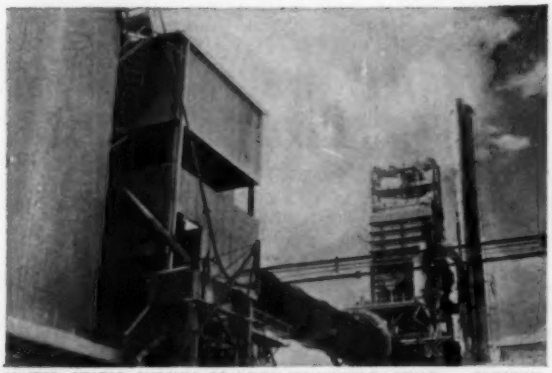
LIME PLANT PRODUCTION BEYOND RATED CAPACITY

One of America's largest lime producers, United States Gypsum Company chose KVS design and equipment for their new plant at New Braunfels, Texas.

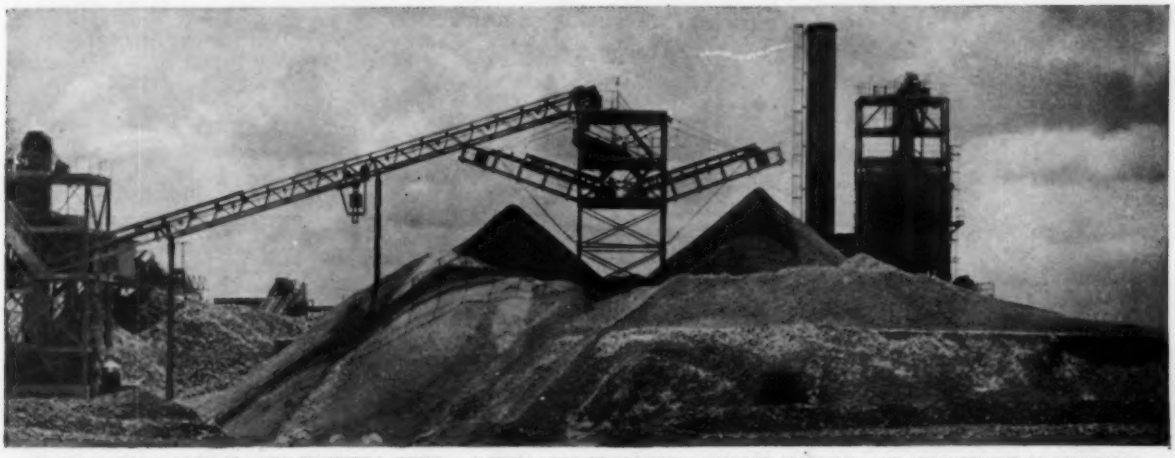
Machinery and equipment designed and furnished by KVS includes crushers, screens, conveyors, kilns, preheaters, deheaters. The installation also provides the latest automatic controls and special equipment that permits high temperature "aging lime" — important in achieving highest quality. Also, storage capacity at this plant has been almost tripled.

Whether your plant is large or small, old or new, Kennedy has the machinery and equipment for better products at lower cost. Let us prove . . . with operating facts . . . why KVS machinery is your best buy. Engineering consultation, anywhere, any time.

UNITED STATES GYPSUM CO., NEW BRAUNFELS, TEXAS — STONE PREPARATION PLANT COMPRISING KENNEDY 37½ S GEARLESS CRUSHER, KENNEDY AAA VIBRATING SCREEN AND KENNEDY BELT CONVEYORS

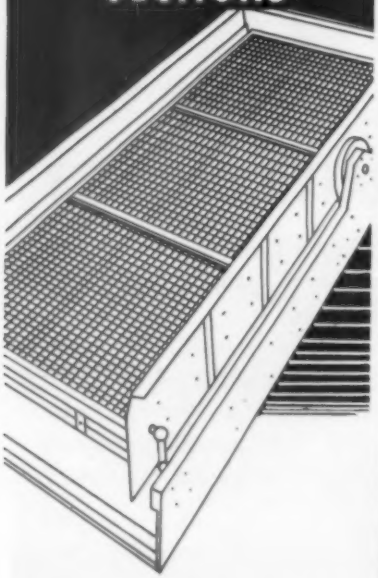


UNITED STATES GYPSUM CO., NEW BRAUNFELS, TEXAS — CLOSE-UP VIEW SHOWING INSTALLATION DETAILS OF KVS 10′ x 150′ ROTARY KILN, PREHEATER, RECUPERATOR AND DEHEATER



UNITED STATES GYPSUM CO., NEW BRAUNFELS, TEXAS — OVERALL VIEW OF STOCKPILE SHOWING OPERATION AND ARRANGEMENT OF CONVEYORS

CLEVELAND VIBRATOR SCREEN SECTIONS



ACCURATELY WOVEN LONGER SERVICE

Accurately woven CLEVELAND Screen Sections are designed to withstand the constant shattering action of heavy-duty vibrating units. Available in all commercial metals and alloys CLEVELAND Screens provide greater resistance to abrasion, corrosion, blinding, and drastically reduce wire breakage.

Engineered to individual job specifications in any size or wire diameter. Samples available upon request.

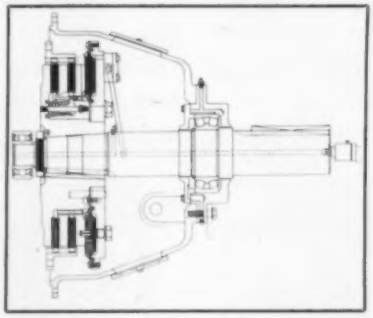
CUSTOM-BUILT

Custom-built and adapted to individual needs. Available in all commercial metals and alloys.

Write for Bulletin 6, 7, and 8

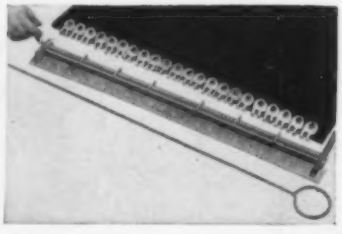
The CLEVELAND
WIRE CLOTH & MFG. Co.
3576 E. 79th St. Cleveland 5, O.

• A batching body capable of hauling four full batches of cement within legal load limits was recently introduced by the Anthony Company. The body features an Anthony Teleramic headlift hoist. Tailgate and batch boards are air-operated from cab. **(60)**



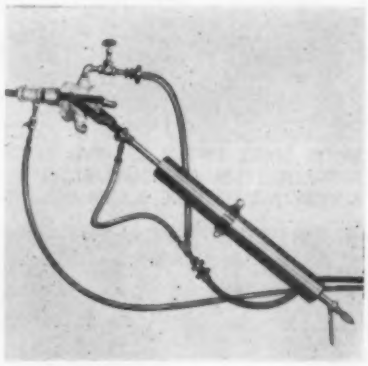
• A new air-operated, remote-controlled friction power take-off just introduced by the Twin Disc Clutch Company is available for use with engines up to 600 hp. output in any industrial application in which a standard power take-off is used.

This air-operated power-take-off combines the Twin Disc Model PO air clutch with the standard Twin Disc friction power take-off. Engagement and disengagement is accomplished by the turn of an air valve. **(61)**



• Development of an aligning holder which speeds and eases the application of the No. 500 and No. 500X Flexco hinged conveyor belt fasteners has been announced by the Flexible Steel Lacing Company. An alignment pin, which is tapered at one end to enter the fastener loop readily, and a cam pin are the main parts of the holder.

The pins hold the fasteners in proper alignment while the nuts are being tightened. After the nuts are tightened the aligning holder is quickly removed from the belt by simply turning the cam pin 90 degrees and pulling out the alignment pin. **(62)**



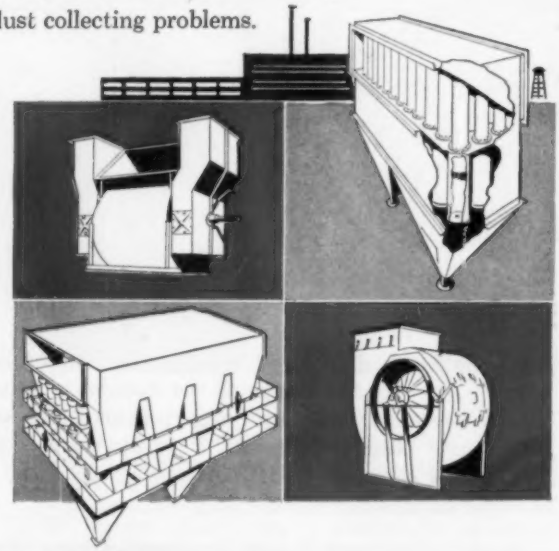
• Powered by a 10-hp., 3,000-r.p.m. air motor, this "Hi-Speed Air Leg Diamond Drill," introduced by the E. J. Longyear Company, has a rated capacity of 60-ft. of E rod. The diamond core drill is cradle-mounted on an air leg for short hole underground coring. It can be operated by one man, and requires no spraging or bracing. As drilling proceeds, the Air Leg advances the string of drill rods into the hole. **(63)**

Your "Cost" Dollars Come Back QUICKER...

with WHIRLEX dust collecting equipment!

If you are concerned with nuisance elimination . . . or with the recovery of process material . . . WHIRLEX can help you. Our research laboratory, engineering and manufacturing facilities are *totally set up* and especially experienced to provide "dollar-saving" solutions to the most perplexing dust collecting problems.

Low original cost *plus* continuous, efficient operation and low maintenance of WHIRLEX equipment assure quickest return of cost dollars!



For a completely integrated and co-ordinated installation, the following shop-assembled equipment is available:

WHIRLEX Type CTF Mechanical Gas Centrifuge Collectors
WHIRLEX Type MTSA 9CYT Multiple Cyclone Collectors
WHIRLEX Induced Draft Fans · WHIRLEX Forced Draft Fans
Special Duct Work · Self-Supporting Stacks
Support Structures

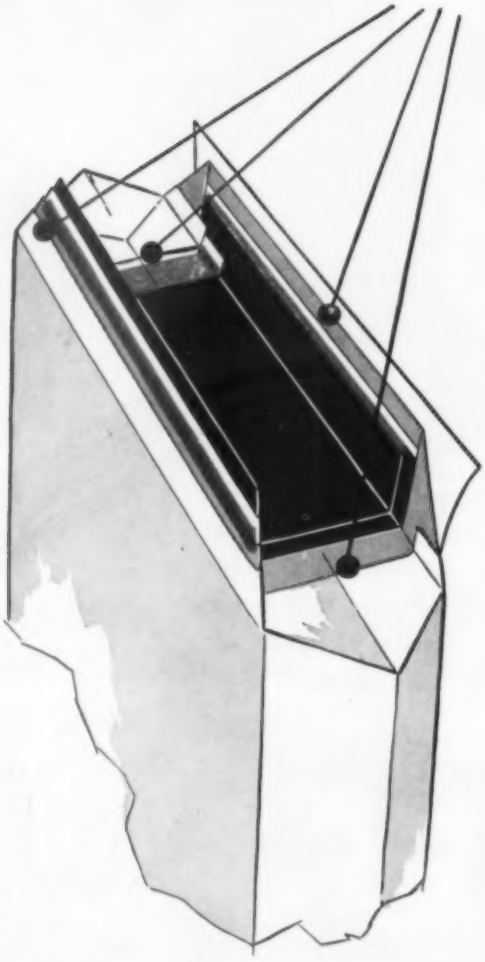
FLY ASH WHIRLEX ARRESTOR

Write today for complete engineering data . . .

THE FLY ASH ARRESTOR CORPORATION

204 North First Street **Birmingham, Alabama**

Bemis STEPPED-END pasted valve bags are "stepped" FOUR ways



to give you . . .

Excellent valve closure

No sifting at bag corners

Added strength

Easy handling

A very clean package

The Bemis design "steps" the plies *four* ways . . . not just two . . . to give the bag ends the *maximum* bond. Naturally, this provides the *maximum* siftproofness, cleanliness and strength. Bemis Standard Cement Bags have led in quality for years. Bemis Stepped-End Cement Bags lead the field in this new construction.

Bemis is your best source for whatever type of cement bag you need

Bemis

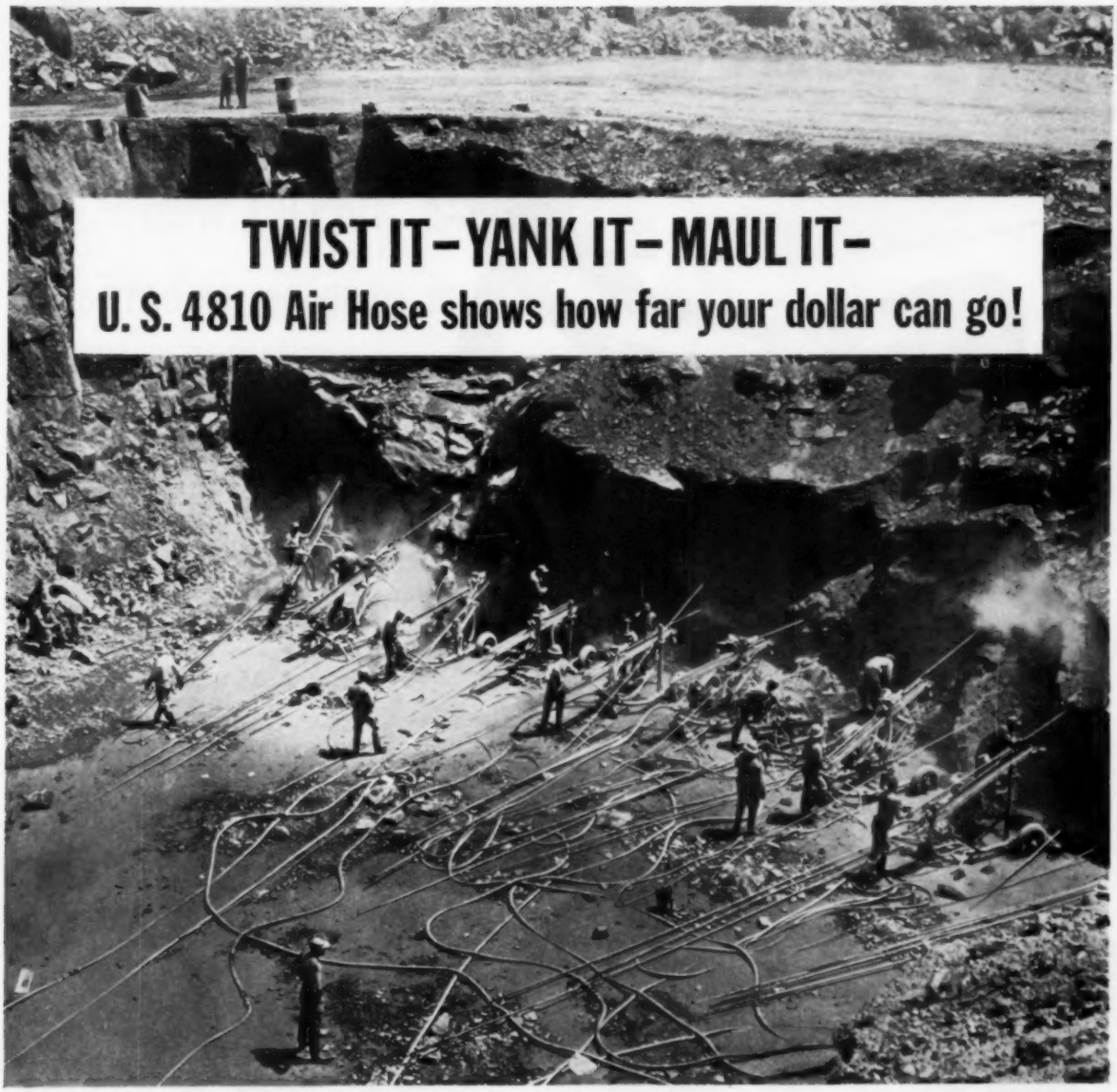
General Offices—
408 Pine Street, Box 43
St. Louis 2, Missouri
Sales Offices in Principal Cities

• A new car shaker, designed to expedite the unloading of materials from hopper bottom, open top railroad cars, has been introduced by Eastern Constructors, Inc. The action of the Eastern car shaker is produced by rotating an unbalanced shaft at 1,800 r.p.m. The shaft is fitted in two heavy-duty self-aligning bearings carried in bearing housings which fit snugly in two heavy side plates. The side plates rest on the upper edge of the car when the shaker is in its operating position.

The eccentric action of the rotating shaft is carried directly to the car without going through any welded connections. The unbalanced shaft is driven by a 10-hp. totally-enclosed motor mounted on a spring-supported base. **(64)**

• Both 6 in. and 6½ in. Hole-Master bits, for use with "down-the-hole" type drills, have been added to the line of percussion rock drill bits manufactured by the Chicago Brunner & Lay Bit Corporation. The splined body is made of super-tough steel. Fast drilling carbide inserts have a high resistance to wear and shock. **(65)**

AIR HOSE



This is the hose recommended for all pneumatic tools and air drills—for use wherever high working pressures, abrasion and general abuse would wreck an ordinary air hose.

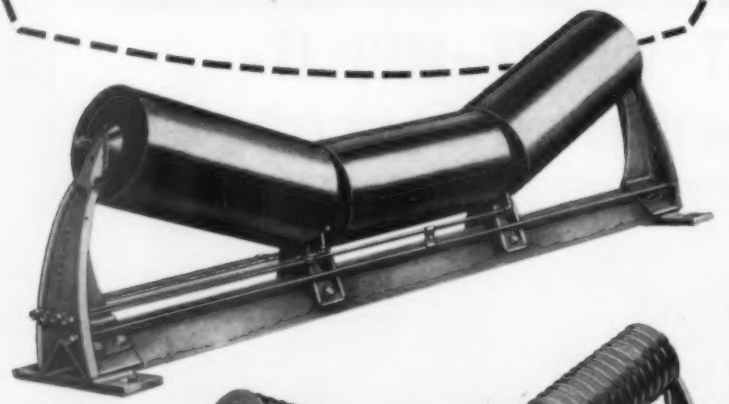
Heavy tools can drop on it. Pieces of rock from blasting can strike it. It can be pulled over jagged stones, grinding gravel—in all kinds of weather. *Throughout all this, U. S. 4810 stays unharmed, delivers full service.*

U.S. 4810 combines super adhesion and extreme flexibility. The rugged service that this hose provides throughout its long life proves that you are wasting dollars if cheaply constructed, short-lived air hose is being used instead of U. S. 4810 Air Hose.

A complete line of hose is obtainable at any of the 28 "U. S." District Sales Offices, at selected distributors, or by contacting us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.

Mechanical Goods Division
United States Rubber

Continental conveyors from stock!



Including

IDLERS OF ALL TYPES

Bucket and Screw Elevators

All Conveyor Accessories

Belt, Screw and Apron Conveyors
Plate or Apron Feeders
Power Transmission Equipment
Trippers Belt Brushes Pulleys
Sprockets and Chain Pillow Blocks
Belting Speed Reducers

Let us know your needs!

CG-570*

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
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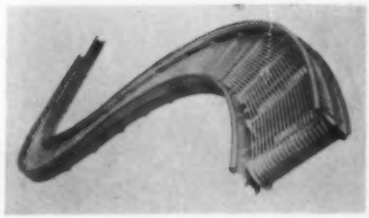
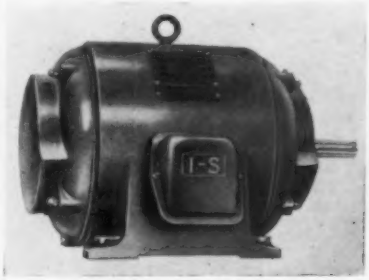


• A new, low-cost, power-driven curve conveyor which will convey bagged or packaged materials around turns of any length has just been introduced by the Power Curve Conveyor Company. Standard widths are 18 in., 24 in., and 32 in., with one belt roller for each 10 degrees of curvature. This Power-Curve conveyor reverses instantly to run in either direction. **(66)**



• Brook Motor Corporation has made available the Brook four-pole, 220-v., 1,800 r.p.m. motors with 20 hp. and up, for service requiring an increment-start motor. A standard two-step, three-pole, general purpose starter, with a time delay of two to five seconds between the two steps, is used. A special wiring for connecting the Brook Delta connected motor is required. The low-cost motor eliminates expensive, complex controls. **(67)**

• Plastic frame safety glasses featuring an ultra-modern lens styling are available from the Chicago Eye Shield Company. The rigid frames retain their original shape. Nose pads give the most comfortable distribution of weight. The new glasses are available in three sizes. **(68)**

Announcing HI-CAP*...

New Du Pont Explosive

designed for economy in blasting operations

Hi-Cap . . . the newest addition to the Du Pont explosive family . . . will assure economy in many blasting operations.

The reason is simple. Hi-Cap answers the demand for a low-priced, cap-sensitive, water-resistant explosive with high strength for all-around shooting.

Hi-Cap is available in 12½ and 25 lb. bags for pouring into small diameter dry holes and in 23-G cartridges of 5" diameter and above.

When Hi-Cap is poured in small diameter holes, a 40% dynamite primer, 1¼x8, is recommended for detonation.

For maximum safety, charges of Hi-Cap should be detonated with Primacord in the usual manner using Du Pont MS delay connectors whenever practical. With this method of firing, you have no blasting caps on the job until the shot is ready to fire.

Notice how the 23-G cartridge is crimped to facilitate loading in the hole. The tape bail serves as a carrying handle, and also for lowering. Since no outside case is required for the 23-G cartridge, there is no packing material or debris left to clean up after the shot is loaded.

Call your Du Pont representative for more information on low-priced Hi-Cap or write: E. I. du Pont de Nemours & Company (Inc.), Explosives Department, Wilmington 98, Delaware.

**Registration applied for.*

DU PONT EXPLOSIVES

Blasting Supplies and Accessories

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Portable VEHICLE SCALES

weigh anything ...anywhere!

Here's the perfect portable vehicle scale . . . rugged, self-contained, easy to install and move, no pit required . . . *accurate!*

Capacities from 20 to 70 tons—lengths from 20 to 60 feet. Individual sections can be joined with *just 8 bolts* for greater length and capacity.

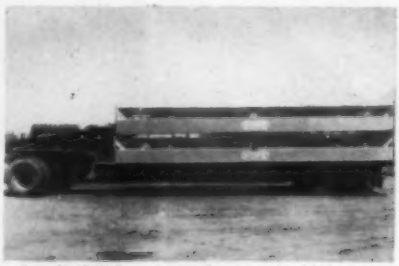
And you can select any weight indication—full capacity beam, type recording beam for printed records, or attachable Weightograph® for direct enlarged visual readings.

All this *plus* the extra ingredient—a solid century of scale skill built into every Howe Scale. Don't settle for less.

PORTABLE VEHICLE SCALE FOLDER ▶

Write today for this folder giving complete details and specifications on Howe Portable Vehicle Scales.

Each section a complete scale—easily joined for greater length and capacity.



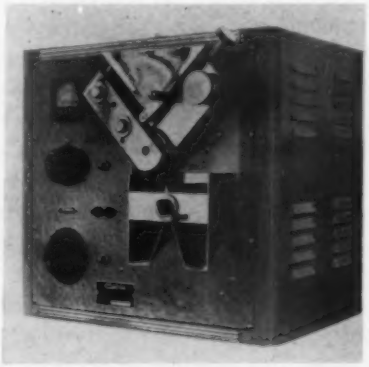
Standard 8' frames can be moved without exceeding legal load limits.

CENTENNIAL 100 YEARS HOWE 1857 1957

The HOWE SCALE Co
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.
RUTLAND · VERMONT

• This new diaphragm-type, pneumatic pump for high head pumping is a product of the Layton Company, Inc. The pump may be used in tunnel work to keep headings dry, and is readily adaptable to deep shaft work where it will pump with a head of 100 ft. or more.

Light and compact, the pump is 22 in. high, 12 in. in diameter, and weighs 65 lb. The pump ejects fluids with 60 percent solids and highly abrasive liquids. Fluids and materials are bypassed from the suction line directly into the discharge outlet without contacting any working parts. **(69)**



• Carpco Manufacturing, Inc., has introduced a compact, high intensity induced roll electro-magnetic minerals separator, designed for laboratory and production control or development. Designated the Model M-12, the unit can handle feed rates up to 2 lb. per minute. The M-12 comes equipped with a specially-designed potentiometer and circuit which allows continuously variable control of the magnetic flux from zero to full saturation of the magnetic components. **(70)**

It pays to take a "SECOND LOOK" before you buy a 1½-cu. yd. tractor-shovel!

Compare the "Big 4" for yourself!

Feature	TerraTrac® 800	Mfr. "A"	Mfr. "B"	Mfr. "C"
Bucket Capacity (Mfrs. rating)	1½ cu. yd.	1½ cu. yd.	1½ cu. yd.	1½ cu. yd.
Engine HP (Net)	72 (80 Gross)	70	66.5	71
Torque Converter	YES	NONE	NONE	NONE
Max. lbs. push or pull, assuming adequate traction	20,000	Not Published	15,170	12,600
Forward Speeds, MPH	(4)0 to 6.0	(4)1.7 to 6.9	(4)1.5 to 5.5	(4)1.9 to 6.3
Reverse Speeds, MPH	(4)0 to 7.0	(2)1.9 to 3.0	(2)2.0 to 4.1	(2)2.1 to 3.9
Transmission	HYDRAULIC POWER-SHIFT	MANUAL CLASH-SHIFT	MANUAL CLASH-SHIFT	MANUAL CLASH-SHIFT
Steering (1) (2) (3)	Brake-Turn Power-Turn Counter-Rotation	Brake-Turn NONE NONE	Brake-Turn NONE NONE	Brake-Turn NONE NONE
Track Frame Oscillation	YES	NONE	NONE	NONE
Dump clearance at max. discharge angle	9'1"	8'3¾"	8'0"	8'0"

Above information based on latest specification sheets available to us at time of printing.

Maybe you didn't realize it! But it's a FACT ... there's as much difference *performance-wise* between the new 1½-cu. yd. Case® TerraTrac 800 — and conventional crawler rigs — as there is between a modern *power-operated* automobile, and the old-style *"clutch-and hand-shift"* machines of 10 years ago.

Part of this difference you can see *"on paper"* — in the accompanying chart. But the real difference comes *"on the job"*, where the extra power, speed and maneuverability of the Case TerraTrac 800 is enabling owners to move up to *40% more yardage per shift.*

Compare the "big-four" for yourself. Then mail the handy coupon below, so your Case Industrial Dealer can arrange a *free* TerraTrac 800 demonstration on *your* job — soon!

CASE INDUSTRIAL

FIRST in quality for over 100 years

Clip ... mail for more proof

J. I. CASE CO., DEPT. F 1147 Racine, Wis., U.S.A.

☐ Send more facts on TerraTrac 800 tractor-shovel.

☐ I'd like a free demonstration on my job.

Name..... Position.....

Company.....

Address.....

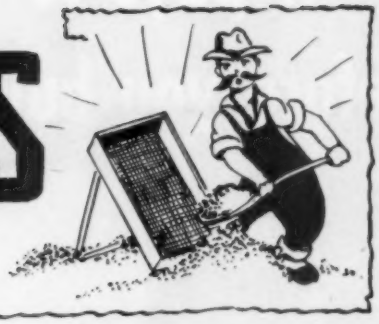
City..... State.....

CT-L-45

Industrial wheel and crawler tractors · loaders · dozers · backhoes · fork lifts

SCREENINGS

by Ray L. Smith Jr.



A MAN has to be something of a contortionist to amount to anything these days.

He has to put his shoulder to the wheel, keep his eye on the ball, an ear to the ground and his back to the wall.

At the same time he must have both feet on the ground, keep a level head, a stiff upper lip, whistle while he works and stay in there pitching as he looks for the silver lining with his head in the clouds.

After doing all this one probably feels a bit like the green infantry man on the wrong end of a grenade. There may be an awesome stillness after the explosion. Then a few fingers and toes are moved. Then arms and legs. And finally raising the head clears the fog from a befuddled, disbelieving mind and there's a joyous realization of "Gad, I'm still alive and kicking."

Strange—but Legal

SNEEZING on a train is against the law in West Virginia, says an article in the *Railway Employees Journal*. And you can't wear your spiked shoes on a train or in a railway station in Maine without being subject to prosecution.

The fact is, that probably you can get away with either of these violations but the old statutes still are on the books. Even Texas has a law which says one cuspidor must be furnished for every three parlor car seats. In Gary, Ind., an ordinance prohibits anyone who has eaten garlic within four hours from boarding a streetcar.

A Vermont law of 1850 required conductors to read Sunday scriptures from train Bibles to the passengers, and the state of Georgia still has laws which prohibit running freight trains on Sunday.

The article in which these interesting and ancient laws was revealed ends on this high note: "The old laws no longer need concern the railroader except as curiosities of the long, interesting, and sometimes amusing history of the iron horse."

The Wrong Way

MANY a man who got involved in a "do-it yourself" project wishes he hadn't. And Henry Szpara, of Little Falls, N. J., may be one of them.

Henry started building a cesspool. He borrowed a dump truck and bought a load of gravel. As he drove home, gravel began seeping out along the main street and a bouncing pebble from the truck scraped a car.

Result: (1) Henry got a $100 bill for painting the scraped car. (2) The city billed him $20 for sweeping up the gravel. (3) He got a summons for littering the road. (4) He lost half the gravel he bought.

The cause of the seepage was a break in the welded tie on the truck gate.

Fate really rubbed it in there.

Henry is a welder.

Operation Disposal

WE'VE just heard of an electronic marvel being tested on the streets of Chicago called the Talking Garbage Can. It talks to passerby's and begs them, in a clear clarion voice, to make use of the service provided and not to be a litterbug.

Our source of information extolls the possibilities of the Talking Garbage Can in helping to keep the city clean. It further points out that if the device proves itself we'll soon find 'em on every corner.

Anybody who thinks for a minute that public servants in the Windy City don't have a monopoly on queer ideas, need only read about the Talking Garbage Can. It staggers us to think what the streets will sound like with one of these damned things clearing its throat on every corner. 'Nuff said.

Potpourri and Succotash

Friends were commiserating with the widow of a tugboat skipper who had fallen overboard and drowned.

"You poor dear," said one, "I hope you were left with something."

"Oh, I was!" assured the widow, "He left me $20,000."

"Twenty thousand dollars! Imagine that! And him that couldn't read or write."

The widow nodded her head earnestly. "Or swim," she added.

The drunk dropped a dime in the slot of the parking meter and watched the needle go up to 60.

"Good gosh," he drooled, "I've gone and lost 100 pounds."

The baldheaded barber was trying to sell his customer a bottle of hair tonic.

"But how can you expect to sell it when you have no hair yourself?" he was challenged.

"Nothing wrong with that," came the answer. "I know a guy who sells brassieres."

The judge looked up from the bench to see a familiar face before the bar.

"I've had you up here for speeding, drunken driving, reckless driving, parking alongside fire hydrants, driving a car with no inspection-lane sticker, and the last time you were here I ordered your driver's license suspended. What's the charge this time?"

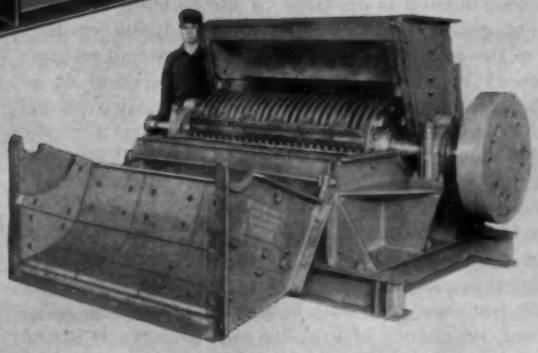
The defendant looked sheepish, then replied: "Jaywalking, your honor."

The foreman reported that the jury was unable to reach a verdict. The judge reproved the jury, saying that the case was a very clear one and one upon which an early verdict should have been reached. Then he remanded them to the jury room for further deliberations.

"And if you don't reach a verdict before evening," the judge said, "I'll have twelve suppers sent in to you."

"May it please your honor," spoke up the foreman, "but I suggest you make it eleven suppers and a bale of hay."

WILLIAMS *heavy duty* HAMMER MILLS



- **Crushes, Grinds, Shreds To Finished Size In One Operation**
- **Reduces Production Costs Up To 50%**
- **Saves Up To 75% On Equipment Cost**

Williams No. 60 GA Mill with heavy duty steel plate frame. Cover has been opened to show heavy duty manganese steel liners, breaker plates, grate bars and hammers.

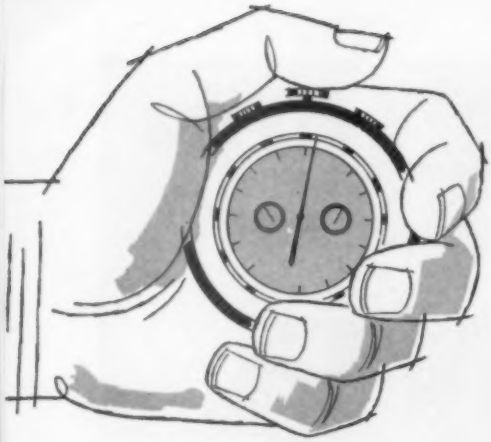
Whether your size reduction job involves crushing, grinding or shredding—whether the material is mineral, chemical, vegetable or animal—Williams has a hammer mill designed to *do it from start to finish in a single operation.* More uniform product, increased output, plus savings in time and labor can *cut production costs as much as half!*

Extra primary and secondary crushers are seldom required with a Williams—no extra drives or conveyors, no costly foundations or buildings for additional crushers are necessary. Expensive maintenance, replacement parts, excessive downtime and labor are reduced to a minimum.

Learn how a Williams hammer mill can step up your output, and improve your product quality. *Write —explain your operation—and ask for a catalog.*

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
802 ST. LOUIS AVE. **St. Louis 6, Mo.**

WILLIAMS
CRUSHERS · GRINDERS · SHREDDERS
Oldest and Largest Manufacturers of Hammer Mills in the World



SECONDS SAVED

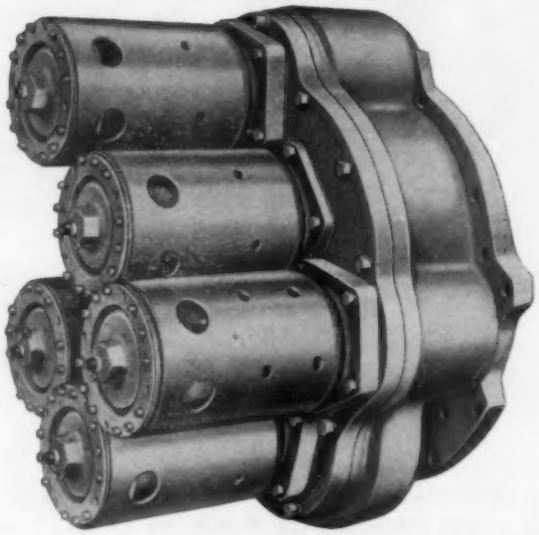
add up fast to give you ...bigger production ...bigger profits

Constant-mesh transmission on Tournatractor® saves shifting time

You can save as much as 80 minutes per 10-hr. day in your pit-tractor operations with instant shifting provided by Tournatractor's constant-mesh transmission.

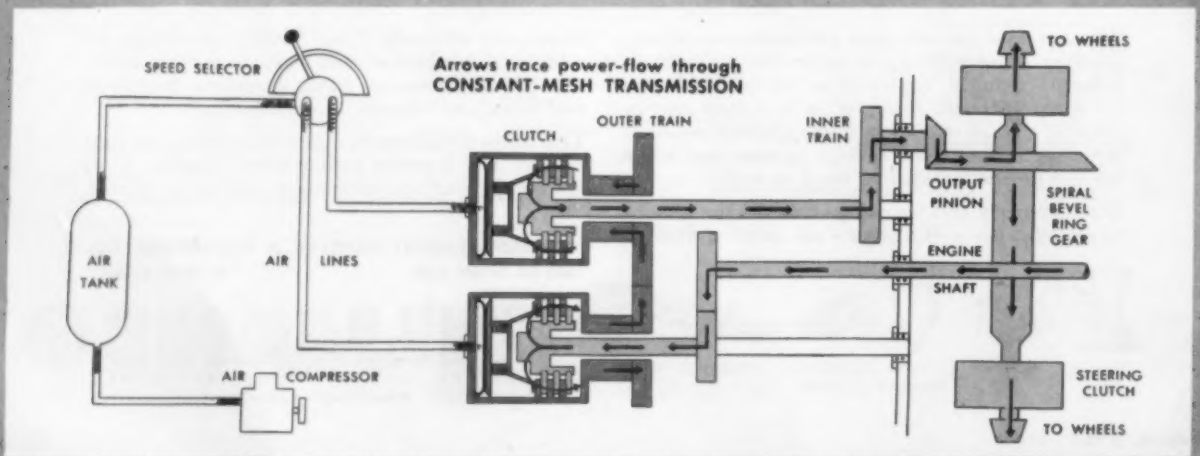
This transmission is operated by air clutches for fast, efficient gear changes. Mounted individually on the ends of the gear shafts, the clutches engage and release in proper combinations through the operation of a simple selector lever.

LeTourneau-Westinghouse constant-mesh transmission gives you non-stop, instantaneous speed-selection and high reverse speeds. There is no need to depress a clutch foot-pedal . . . no double-clutching . . . no meshing of one gear against another. With quick movement of the small speed selector, operator transfers power instantly from one gear ratio to another . . . with no gear clashing, no chance of locking out-of-gear. It gives faster pickup for drifting a load when dozing, and for pushing or pulling . . . gets more work done in less time!



Air-actuated transmission clutches save seconds — increase production. Each of the five 7" multiple-disc clutches in Tournatractor transmission has 290 square inches of positive gripping surface. These heavy-duty clutches engage and release in proper combinations at the touch of a control-lever. To make clutch adjustments, all you do is loosen a few Allen-head screws and turn adjusting ring "in" or "out". Transmission gears are fully enclosed and operate in a bath of oil. Lubrication points are conveniently located for quick, easy accessibility.

Copyright 1957 by LeTourneau-Westinghouse Co.



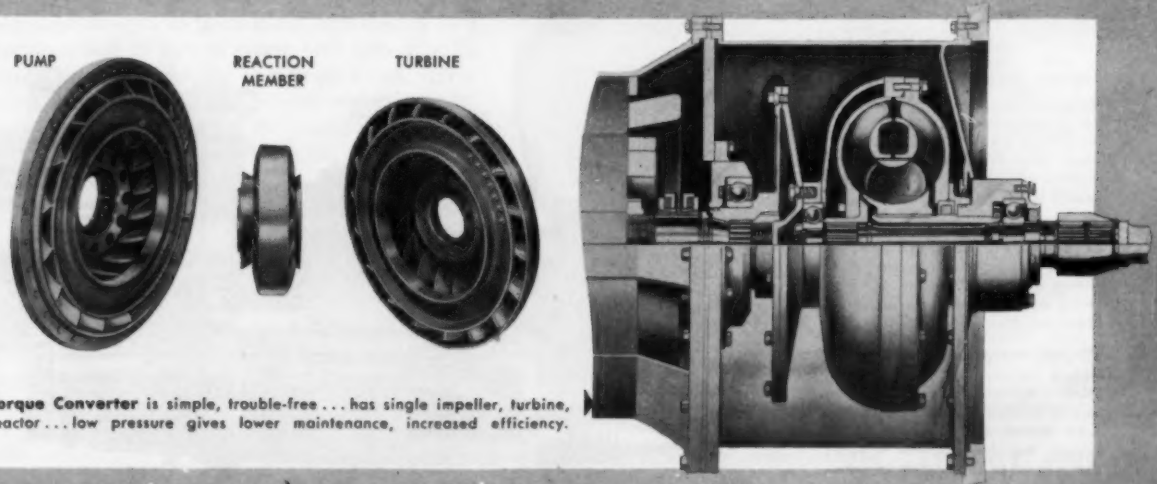
Torque converter saves seconds thru faster, more efficient operation

With Tournatractor's highly efficient single stage torque converter you get the equivalent of an infinite number of gear ratios within any gear range. It insures effective application of maximum horsepower at all times, over the complete speed range from 0.0 to 17.2 mph.

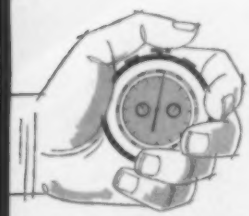
The LeTourneau-Westinghouse torque converter is a low-pressure unit, simple, and trouble-free. It has a single impeller, single turbine, and single reactor. Because it operates at low pressure, it is easy to keep the system sealed for lower maintenance.

Torque converter smooths out the shock of changing gears. It automatically balances load and torque, making gear selection less critical. Maximum efficiency is secured at *all* times by *all* of your operators. It automatically adjusts the speed ratio for more power, more speed, as needed. It provides you with better performance at all times in all your pit-tractor operations . . . dozing blasted rock on shovel clean-up, maintaining stockpiles, pushing gondolas, pulling other equipment, or maintaining haul-roads.

For more ways to save seconds that add up to bigger profits . . . see next page



Torque Converter is simple, trouble-free . . . has single impeller, turbine, reactor . . . low pressure gives lower maintenance, increased efficiency.

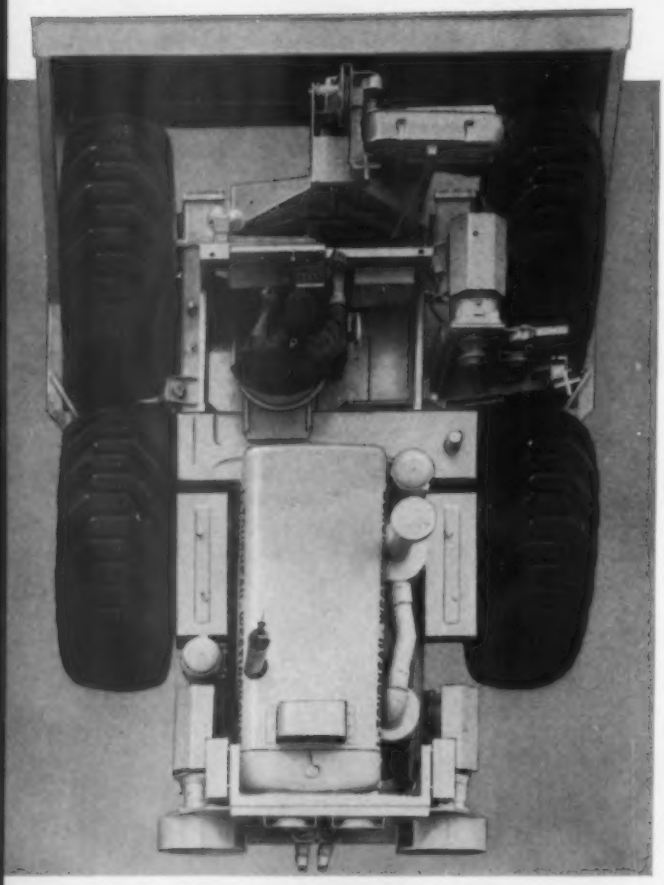


SECONDS SAVED...with

(continued)

FAST ACCURATE CONTROLS

at point-of-action



You save time with easier, faster operation of Tournatractor®

There's no faster control action possible than that provided by Tournatractor's instant-acting electric motor at point-of-action. Push a dashboard switch, and the motor starts instantly... reaches 1800 rpm from a standing start in just 1/5 second. At command of the switch, full power is reversed in opposite direction in ¼ second! A simple, spring-loaded, disc-type brake locks the motor automatically when switch is released.

With this motor control system, there is no more "feeling-in" of a clutch, or waiting for hydraulic pressure to build up. There are no more stresses and strains of mechanical stops... no slipping... no pause to build up power. Operator simply pushes the switch with his finger and gets instant action.

Electric power where you want it with flywheel-coupled generator

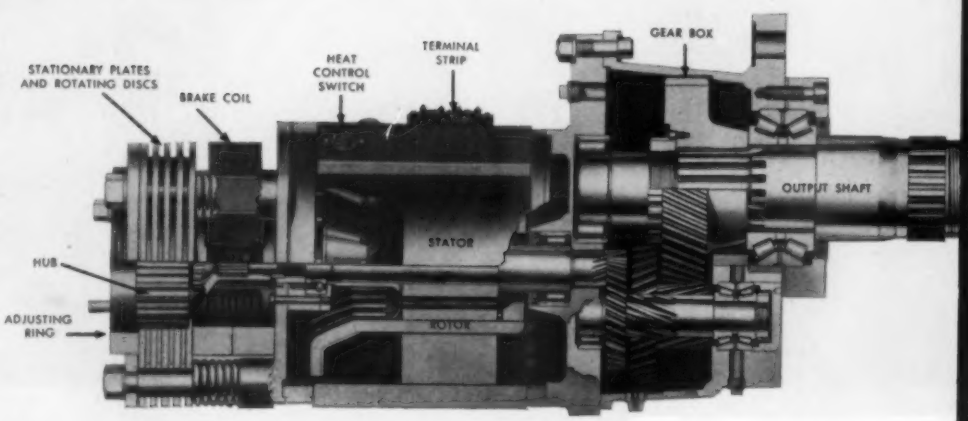
Power for electric controls, lights, and battery charging, is supplied by a heavy-duty AC generator mounted directly in line with engine, as part of the engine flywheel. Engine turns the generator rotor, which produces alternating current to operate point-of-action electric motor which powers blade action of Tournatractor.

Simple, weatherproof motors

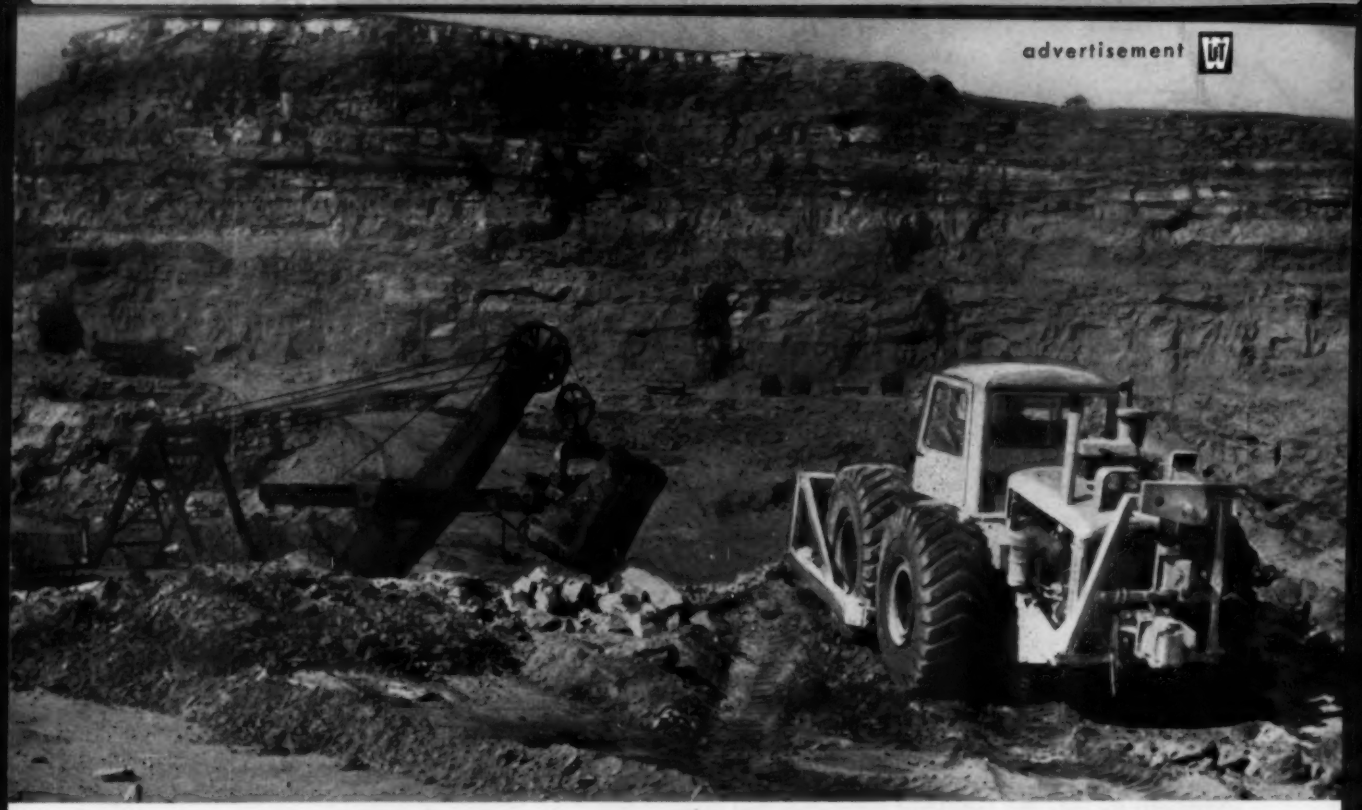
Motor is mounted at point-of-control, where it works most effectively. Cable wear and expense is much lower than that of maintaining hydraulic or mechanical power-control units.

Motors are simple 3 phase, 300 volt AC design, with DC lugging power. They are brushless, compact, consisting of only 2 parts — a rotor and a stator. Rotor fan cools motor, blows out dust and moisture.

Simple, foolproof design makes motors waterproof, weatherproof. There is no change in control-action due to variations of climate or altitude. Motors are so effectively insulated that they continue to operate even when submerged in water.



advertisement



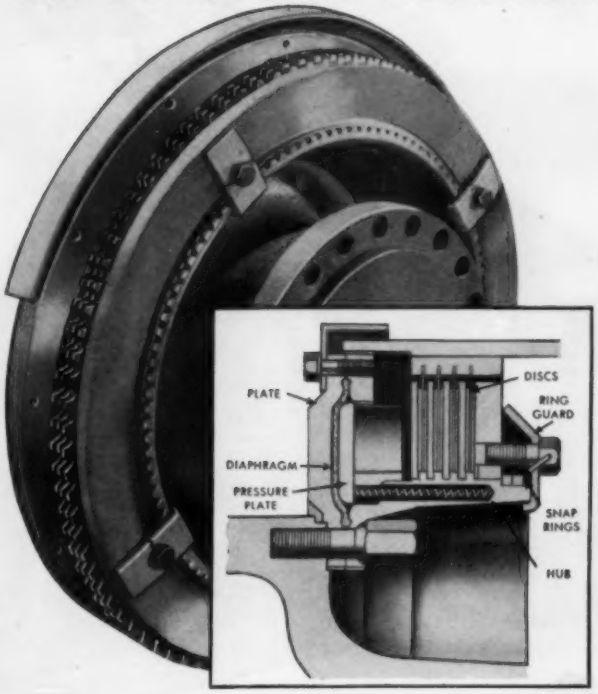
HEAVY-DUTY AIR BRAKES

with 3,762 sq. in. of brake surface

Complete safety on steep banks, narrow pit roads, around installations and equipment

Heavy-duty air brakes on all four wheels provide 940 square inches of braking surface *on each wheel.* These improved air brakes consist of alternately-placed lined and plain steel discs. The lined discs, functioning as a brake-lining, spline to hub of wheel and turn with it. The unlined discs, functioning as a brake-drum, spline to axle and remain stationary. Pressure on brake-pedal operates air-valve which forces the multiple lined and steel discs together to slow or stop the big ground-gripping tires of the Tournatractor.

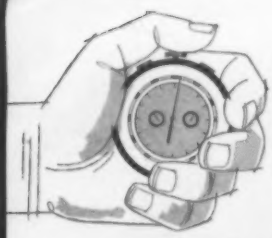
Master-valve equalizes air-pressure to each of the four wheels. Brakes respond instantly, evenly, to amount of air-pressure released by foot-pedal. Smooth and powerful, these air-brakes provide safe control in any weather, improve maneuverability. Operator has the confidence in his machine to work faster anywhere in your pit . . . on steep banks, twisting haul-roads, on narrow benches, and around shovels and other equipment on the pit floor.



Tournatractor brakes are compact . . . can be removed as an assembly from machine. Their large braking surface means fewer adjustments.

For more time saved with lower maintenance . . . see next page

tude. Motors are so effectively insulated that they continue to operate even when submerged in water.



SECONDS SAVED...

(continued)

WORKS MORE PRODUCTIVE

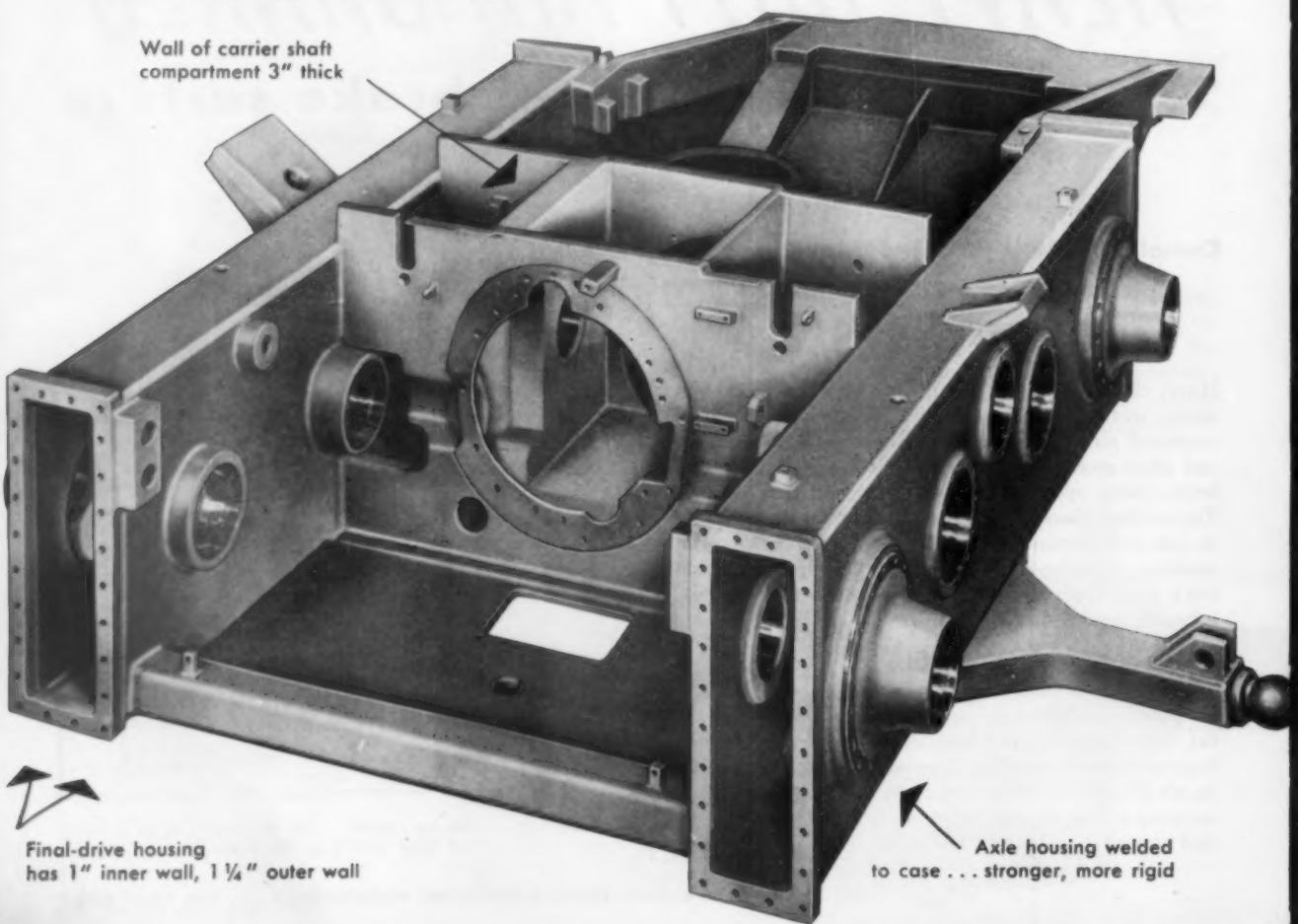
Low maintenance cuts downtime Tournatractor® on scattered pit

On Tournatractor, four rubber-tired wheels do the work of 450 to 550 parts in a crawler-track assembly. Obviously, less maintenance and less lubrication are involved to save time, increase profits.

Over 6 months of steady operation, your Tournatractor charts call for only 660 individual lubrication and regular maintenance operations. For the same period, a crawler may require as high as 1269 operations. That's twice as much service time as needed by Tournatractor. Crawlers require many mechanical service operations and the periodical rebuilding, or replacing, of track assemblies. Since these repairs are often put off, or neglected, because they may seem relatively unimportant, their rapid wear results in loss of efficient power.

The big, flexing tires on Tournatractor are self-cleaning. Crawler tracks and grousers accumulate mud and grit, increasing wear and power loss. Service takes longer, because extensive cleaning is required for effective lubrication or repair of track assemblies.

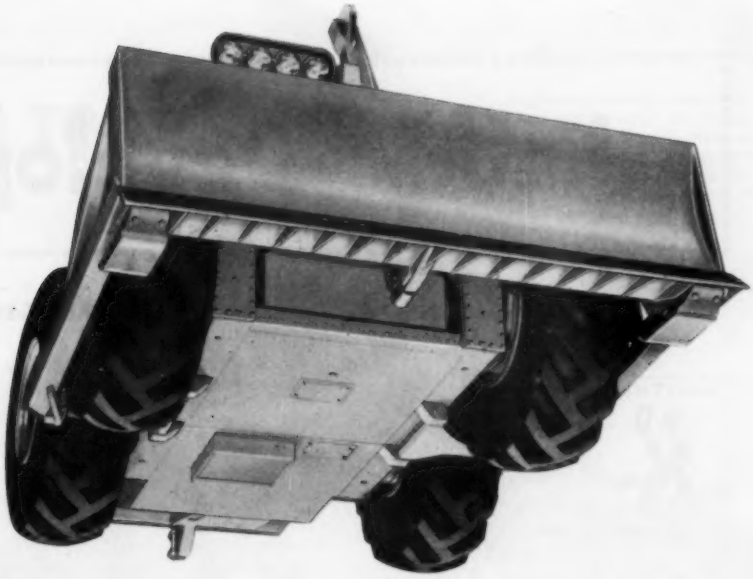
Simplicity of electric control at point-of-action on Tournatractor is another feature that keeps mainten-


Wall of carrier shaft compartment 3" thick
Final-drive housing has 1" inner wall, 1 ¼" outer wall
Axle housing welded to case . . . stronger, more rigid

For more time saved with lower maintenance . . . see next page

HOURS

for high-speed assignments



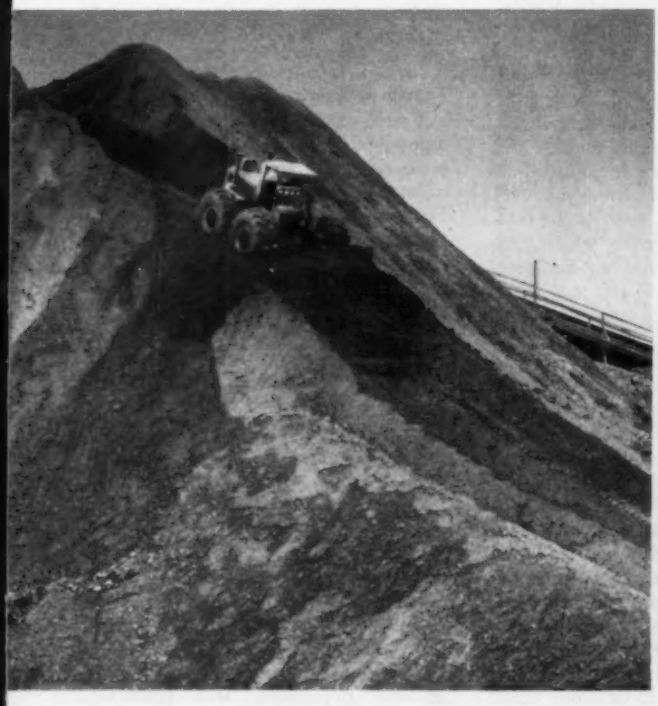
ance costs low . . . equipment efficiency high. Control cables are short to last longer. There is no hydraulic fluid to check and replace, no piping to service, no variation in operation, winter or summer.

Remember, too, that since initial cost of Tournatractor is less than crawlers of comparable engine horsepower, ownership cost is also lower. In addition, because of enclosed anti-friction drive, Tournatractor is better protected from wear, will give you longer life, and higher efficiency of high-speed performance during its lifetime.

Ask for more information

To save seconds that add up fast for greater work-capacity and bigger profits, it will pay you to look further into Tournatractor. Write or phone your LeTourneau-Westinghouse Distributor for free 32-page Tournatractor Bulletin, or ask for a demonstration on your job. See why this high-speed, rubber-tired tractor has faster acceleration, better maneuverability, lower maintenance, to give you the speed and mobility you need in your pit operation.

CT-1450-M



LeTourneau-**WESTINGHOUSE** Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Labor Developments

Collective Bargaining Developments

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations

Washington, D. C.-Philadelphia, Pa.

A BACKWARD look, for about a year, indicates that some very significant trends in collective bargaining have been further re-enforced.

The most important of these is the trend toward longer-term labor agreements and the accompanying development of deferred increases at annual or other periods during the term of the agreement, as well as the general incorporation of cost-of-living escalator clauses.

This trend actually took form at least a year earlier, when many agreements, particularly in the automobile, farm-equipment, and related industries were negotiated to include annual deferred wage increases, as well as cost-of-living adjustments. As a result, during 1956, at least as many wage increases resulted from these previous negotiations as from negotiations taking place during that year.

Nevertheless, during the last year a record was set both for the number of wage agreements that specified wage changes for a period of more than a single year and for the number of workers affected by such increases. About two-fifths of the contracts negotiated during 1956 included provisions for such deferred wage increases. These covered a large number of workers and included contracts in very important industries such as the basic steel and related industries, the railroad industry, the meat packing industry, and others. Also, approximately a third of the wage agreements included cost-of-living escalator clauses. The contracts in the same important industries mentioned above also included such provisions.

The longer-term contracts with deferred increases reflect what many students of labor relations are calling "more mature bargaining relationships." Certainly, since they avoid the necessity for annual renegotiation of the contracts, they also avoid the possibility of strikes each year, which have been so unstabilizing. On the other hand, the built-in wage increases included each year have been criticized primarily on the basis of their inflation potential.

The cost-of-living escalator clauses seem to have a lesser significance. These clauses have had an up-and-down history. They become popular during periods of rising prices and lose their popularity during other periods. A remarkably large number of influential employers have gone along with these clauses despite the fact that they make future labor costs entirely unpredictable and thereby seriously complicate their planning problems. The last year has also seen the re-enforcement of the trend toward improved supplementary benefits. Three out of four of the contract negotiations either established or increased supplementary benefits. Generally, more than one type of benefit was liberalized.

More than any other, health and welfare benefits were introduced or liberalized. This occurred in very important contracts, such as the contract in the steel industry which provided for an additional one and one-half cent contribution per man-hour from both employer and employee for various welfare benefits, and the contract in the railroad industry in which the companies agreed to pay two and one-half cents more an hour to expand hospital, medical, and surgical benefits to dependents of nonoperating employees.

In addition, two out of every five agreements liberalized vacations. Most frequently, they added one-half week's paid vacation for workers with 10 but less than 15 years of service. The steel settlement also added one-half week's vacation for those with 3 and 4 years of service and for those with 25 or more years' service.

The next most common changes were the reduction in eligibility requirements for a third week of vacation, generally for those having from 15 to 10 or 12 years of service, or the addition of a fourth week after 25 years of employment.

Holiday provisions were liberalized in one out of three agreements. Generally, the change involved an additional paid holiday. This was often Good Friday. The standard 6 paid holidays per year appear to be giving way to a new standard of 7 paid holidays per year, and a large and increasing number of labor agreements are calling for an eighth holiday.

Pensions were established or increased in one-fourth of the contracts. A notable development was the provision for the vesting of pension rights in the steel and related agreements.

Supplemental unemployment benefit plans continue to spread, principally in the steel, aluminum, and rubber industries. The number of employees covered by supplemental unemployment benefit provisions amount, by now, to more than 2,000,000.

Trend in Nonproduction Workers

Traditionally, businessmen pay a great deal of attention to their overhead costs. An increase in this item is generally regarded as a bad thing. Thus, a rise in the number of nonproduction workers in relation to the number of production workers has frequently been regarded as undesirable.

A recent study by the U. S. Bureau of Labor Statistics shows that for many years during these 1920's the proportion of nonproduction workers to total factory employment remained relatively constant. In the 1930's it rose, but only because there was a sharp decrease in the number of production workers. At least for a while many employers tried to keep their key men, in the hope that the depression would end and they would again need the services of these persons.

The rise in total employment later in the depression was provided mainly by production workers, so

(*Continued on page* 148)

HAULS 4,000 TONS OF ROCK DAILY

Tournapull operator backs Rear-Dump up to edge of crusher, and flips electric hoist-switch. As body raises, rocks are dumped fast and safe. Body swings below and behind rear wheels, so rocks cannot obstruct wheels.

An abundant supply of base material was vital to Broce Construction Co., Dodge City, Kansas, when they began putting an 18″ base on a 10-mile section of highway. Nelson Bros. Quarries, La Harpe, contracted to supply Broce with more than 400,000 tons of stone and sand for necessary base material. In order to maintain the continuously high rate of aggregate production needed, Nelson Bros. relied on their 3 high-speed, 22-ton LeTourneau-Westinghouse C Tournapull Rear-Dumps. These fast-stepping haulers high-balled material from pit to crushing plant . . . hauled 4,000 tons of blast-rock daily per machine.

Note big 22-ton rock load in heavy, welded-steel Tournapull Rear-Dump body. On this rugged pit job machines successfully withstood much of this hard pounding.

Average 22 tons of rock per load

At Nelson Bros.' quarry, 3 mi. northwest of Reading, C Rear-Dumps worked with 2½-yd. shovel. Their short 90° turn radius enabled operator to maneuver machines easily, and spot fast under dipper. Each L-W Rear-Dump was loaded with 22 tons of blast-rock in 1¼ min. Rear-Dump's wide 8'9″ bowl, with low rear-entry, provided large, easy target area for shovel operator . . . reduced spillage and clean-up. Since shovel operator did not have to "lift" dipper high to get in and out of bowl, he saved valuable time on bucket's swing-cycle. This, plus time saved in hauling, maneuvering, and dumping, enabled Rear-Dump to make more round-trips . . . haul more tonnage per working-day.

Big brakes add safety on downhill hauls

'Pulls' multiple disc air brakes on all 4 wheels provided 3,762 sq. in. of braking surface for safe hauling on down-grades. At crusher, operator swung in fast . . . set rear-wheel brakes . . . and touched electric switch on control panel to activate hoist-motor and raise body. As bowl tilted, it swung discharge lip below and behind rear wheels . . . kept rocks from slipping underneath wheels as Rear-Dump fed load directly into crusher.

"These machines beat anything"

Supt. Carl A. Nelson reports his Tournapull haulers work profitably and efficiently. He said, "We have had excellent service from our Rear-Dumps. They haul from quarry pit to crusher, and have to take abuse on that type of work — but they are plenty rugged to take it." Nelson added, "They have plenty of power . . . can say we've had trouble-free service. We've worked all winter, in all kinds of weather. We can always depend on quick, easy starting on coldest days. These machines beat anything I've seen."

Heavy-duty haulers for tough jobs

For rugged, heavy-duty haulers to handle those tough jobs at your quarry, investigate the advantages of Tournapull Rear-Dumps. They take rough treatment . . . give you continuous high production. Call or write us for complete details.

Tournapull—Trademark Reg. U.S. Pat. Off. CR-1195-Q-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

for a more profitable operation

Try Cultivating Employee Loyalty

By HAROLD J. ASHE

ONE of the intangible assets of a quarry operation is the loyalty of employees. Lack of employee loyalty can be a dangerous although hidden liability, one which can adversely affect net earnings despite efforts to increase them.

Probably most employers assume that their employees are loyal to them. This can be a misleading assumption if it is not founded in fact. The plain truth is that an employer, by the very nature of the employment relationship, is unlikely to know whether he inspires loyalty or not. Certainly, few employees are so stupid or inept as to fly the flag of disloyalty within an employer's view. While obvious acts of loyalty may be discernible to an observant employer, many subtle acts of disloyalty may go undetected.

Even if there is a surplus of available help in an area, securing good and loyal employees and retaining them may not be easy. Employee turnover may be high, particularly among those employees whom the employer values the most highly. While the dollar cost of employee turnover may not be computed exactly, it can be a continuing drain on profits. Time spent in breaking in new employees might be utilized much more productively.

Getting and holding valuable production or office employees must be worked at, just as a quarry operator exerts himself wringing out a profit from his operations. In fact, the two tasks are interrelated. Management policies and attitudes toward employees—and employee attitudes toward employer—are reflected on the profit side of the ledger.

An employer who is indifferent to employees *as personalities* is likely to attract only employees who are indifferent to him. If he manifests no concern whatsoever for their welfare, he need hardly be surprised if they show no eagerness to protect his interests when occasion arises. A cold, impersonal detachment on the part of an employer is likely to be met in kind by employees.

In exploring the problem of getting and keeping employees and inspiring their loyalty, a few generalities may not be amiss. Every employee is subjects to the fears, hopes, and frustrations, the likes, dislikes, and prejudices which bedevil the human race. His reactions are many and often unpredictable; his pressures are varied. He seeks recognition for his talents and efforts, however limited these may be. This is one of his strongest drives—seeking for recognition and hoping that he is needed. If he fails to get this recognition, if he feels he is unimportant as a person, his ego suffers. He becomes frustrated and is likely to be miserable in his job, however well he conceals this from view. His employer may be satisfied, but such an employee is under strong compulsion to move on to another job although he may not better himself.

Therefore, employers who year after year experience a high percentage of "quits," and who have difficulty holding valuable employees might give some serious thought to the problem of how to imbue employees with loyalty. A loyal employee is happier and more trustworthy than a dissatisfied one. He is more productive and less wasteful.

Employee loyalty may be cultivated in many ways and with many approaches. What may spark loyalty in a production worker may be of questionable value with an office employee, or *vice versa.*

Training Employees From the day a new employee is hired, the process of developing loyalty should be worked at. The first day's impressions of an employee

Recognition+training+encouragement+tact+patience

may be favorable or otherwise. A new employee should be made to feel welcome. Every reasonable effort should be put forth to make his first few days in a strange environment easy. This is no less true of a young fellow just entering the industry than of an older person with years of experience. The same is true of new office employees. Welcoming production workers may be of a rough-and-ready character, while in the office it may take a more suave form.

First impressions, it bears repeating, are of paramount importance. Even the most hard-bitten production worker is likely to respond favorably, though he'd probably die before admitting he likes a decent reception when he starts to work. He may not only respect the dignity of honest labor but expect as the minimum requirement of employment that the dignity of his person be respected.

A new employee should be indoctrinated thoroughly, and as quickly as he can absorb it, he should be instructed in any policies, job practices, or techniques which touch his duties or those of the workers around him. If there are any fringe benefits not generally enjoyed in the industry, these should be made known to the new employee immediately. Don't keep such benefits a secret from him to ferret out or stumble on by accident. Presumably, an employer has voluntarily instituted such extra fringe benefits to encourage loyalty. Therefore, he should familiarize a new employee with them from the outset. Office employees should know about paid vacations, bonuses, or opportunities for advancement, if there are any. Only the least ambitious lout is uninterested in his future prospects, and he's not a likely candidate for any job.

Encourage Initiative A sure way to dampen loyalty is to frown upon employee initiative. Such initiative is not too common; and when it manifests itself, it is easily and often permanently discouraged. Initiative is a reflection of an employee's personality. It is his loyalty seeking self-expression.

Even if an employee's initiative is misdirected, and does violence to production methods, management procedures or rules, it should be recognized and treated with respect. *Initiative is a priceless ingredient, if it can be harnessed and directed toward the right goals.* Initiative is an employee's offering above the requirement of his routine tasks. It is a spendthrift employer who treats initiative lightly or discourages it instead of directing and encouraging it. Initiative, properly channeled, can enhance profits while strengthening an employee's loyalty. It can give an employee a terrific boost up to Cloud Number 9.

Reprimand With Care An employer should exercise extreme care in the way he reprimands an employee. Few employees deliberately make mistakes, although there are some unfortunate individuals who have an uncanny faculty for blundering. More often, mistakes are made by employees who are most desperately trying not to do so. They just don't know any better, so help them!

Unless mistakes are repetitious, and show no indication of abating, an employer should exercise patience in correcting errors. Under no circumstances should he resort to ridicule or sarcasm. In correcting errors he should take pains to explain *why* the employee's action was wrong and *why* his way is correct. Whenever possible, he should correct an erring employee out of hearing of other employees, and if circumstances permit, out of sight of others, although this last admittedly may not always be possible. To be publicly reprimanded will result in needless embarrassment and humiliation, real or imagined. The Chinese are not alone in attaching great importance to "face." The reprimand may rankle for days, feeding upon itself, long after the employer has forgotten the incident. The resentment may account for a lot of heel-dragging, even job accidents which injure others.

Listen to Grievances Trivial complaints of employees have a way of building up to major grievances. An employer may invite serious consequences if he discourages employees from airing their grievances to him. If he makes a practice of dismissing grievances impatiently, the time may come when more serious complaints fail to reach his ears. Often the discussion of a grievance may solve it. Getting a grievance off his chest may give an employee a real lift, and further action may not be necessary. His loyalty will be given a boost because his confidence in his boss has been renewed.

Mutual Respect Taking an unfair advantage of an employee because of the employment relationship is ill-advised. An employer is entitled to a certain amount of respect from his employees. The latter are no less entitled to the same consideration from him. Nothing should be said or done which even subtly implies an inferior *personal* status for employees, regardless of their position in the company organization. If a feeling of inferiority is present on the part of employees, any of them, inferior performance will result, even as employee loyalty suffers a sharp drop.

Belonging Most employees like to feel they belong to an organization. This is not encouraged by an employer's aloof attitude. The atmosphere of a business is created largely by an employer himself. He sets the tone. If he is friendly toward employees, they are likely to respond in kind. If he shows a genuine interest in their welfare, within the limits of employer-employee relationships, this can be contagious. It will be reflected in employee attitudes toward the employer. A friendly employee is more likely to be loyal.

Praise When Deserved An employee's efforts and accomplishments in the business world should be noted and recognized. Too often an employer is tempted to criticize an employee for his mistakes, however few, while refraining from praising him for work well done. To be fair, criticism must be balanced by recognition, when it is deserved. Praise, temperately given, costs nothing, yet it is an important factor in winning and holding employee loyalty.

+respect+friendliness+praise=employee loyalty

Unique Excavator Solves Quarrying Problem of Florida Operator

A view of the patented excavator used in removing erosional detritus from pockets and fissures in the stone formation at the Williston operation. The machine at the right is assigned exclusively to handling the excavator. Pockets visible in the foreground have already been cleaned by the jetting action of this unusual equipment.

UNFAVORABLE conditions sometimes inherent in stone and other geological formations are at times solved by quarry or pit operations with unique operating methods. Such is quite true in the case of the Williston Shell Rock Company of Ocala, Fla.

An affiliate of the J. H. Craggs Construction Company—both firms having been founded over 25 years ago by the father of J. H. Craggs Jr., now president—the Williston organization is engaged in three open-pit crushed stone operations west of Gainesville, near the towns of High Springs, Newberry, and Mayo. Respectively, the operations are known as the Buda, Haile, and Dell mines.

The Buda mine was recently the scene of the first use of a unique item of operating equipment with which clay and detritus are removed from cavities and fissures in a virgin deposit. Designed and patented by the president of the company, this unit, which operates on the capacity imbalance principle, is known as the Craggs' Hydraulic Excavator. Its development was based on the need to remove the impurities from the deposit, prior to processing of a stone which due to its softness, is difficult to wash, in order to meet certain specifications.

Due to its high calcium content and relative softness, the deposit is referred to locally as limerock; it is found throughout the central and northern portions of the state. Quarried by the Williston firm primarily to furnish roadbase and stabilization materials for road construction in northern Florida and parts of southern Georgia, the material must be free of the impurities found in the pockets and seams of the formation in order to meet the calcium content requirements. With respect to roadbase stone, this must be 95 percent, in a product that ranges from 3½ in. down to dust, while in the case of stabilization materials, which range from 1½-in. down to dust, the content must be at least 90 percent.

At the Buda quarry, overburden averages 6 ft. Approximately 34 ft. of rock is exposed above the water table, and another 25 to 30 ft. is available below the table based on the excavating limits of the present equipment. Another limiting factor with respect to quarrying depth is a layer of crystalline rock, impractical for the type of material required, below the stratum now being recovered.

All deposits were located with prospecting methods involving topographical surveying and exploratory drilling. Once established, the areas are cleared of trees and undergrowth by Allis-Chalmers tractors equipped with torque converters and cable-operated dozer blades. Overburden to be removed is then stripped by dragline, or by tractors with scraper pans.

If a dragline is used, the overburden is cast away from the area to be excavated, and the tractor is moved in subsequently to dress the rough stripping down to bare rock. This exposes the tops of the pockets and fissures common to the formation.

These breaks are described as resulting from subterranean faults

which caused the homogeneous mass of the formation to crack in an irregular manner—leaving the openings subject to filling with erosional detritus. A wide variance is found in the fissures—a range from a few inches to 30 or 40 ft. in width, and depths of a few feet down to a point below the water table in some instances. There are also occasional interconnections.

Obviously these conditions are not amenable to practical and exclusive excavation by mechanical means. However, prior to the development of the Hydraulic Excavator, removal of the undesirable material from the pockets was carried out by a dragline equipped with a clamshell and a labor gang of 30 to 40 men. Actually, the severe limitations on the machine caused by the irregularity of the fissures caused the major part of the operation to be carried out by the laborers, who used hand shovels and rope-slung buckets. It was necessary to provide trucks and tractor-drawn scrapers to carry away the material removed from the pockets.

All of the foregoing problems were successfully solved when the new excavator was put into operation. Not only does this unit have an excavating capacity equal to that previously obtained with a clamshell, plus the 30- to 40-man labor gang; it requires only a 3-man operating crew. Further, trucks and scrapers are no longer required to remove the debris, since the latter is pumped by the excavator to a disposal area.

Designed with a discharge capacity greater than the water which it jets into the cavities, as well as the cubic displacement of the material being excavated, this self-contained patented excavator is suspended from the boom of a Link-Belt Speeder LS-68. Essentially, the unit consists of a steel tube or probe about 15 ft. long mounting a discharge pump at its upper end. A hose connection is provided just below the pump for intake of jetting water.

At the lower end, water under high pressure is forced through jets, thus allowing the probe to penetrate the material. Water and sludge is then drawn by the pedestal-mounted discharge pump on the upper end through pick-up or intake points above the jets in the head of the excavator.

The high-pressure jetting water is supplied at 150 p.s.i. by a 1,200 g.p.m. capacity 6- by 5-in. two-stage Fairbanks-Morse pump driven by a General Motors 671 diesel. This pump in turn is supplied from a lake area by a transfer unit—a 6-in. single-stage Fairbanks-Morse pump with a capacity of 1,200 g.p.m. The latter operates on a head of approximately 35 ft., and is located about 800 ft. from the high-pressure pump.

The pedestal-mounted discharge pump at the top of the excavator probe is an 8- by 6-in. Allis-Chalmers unit of Allisite—a material highly resistant to abrasion. It is driven by a 600-r.p.m., 25-hp. motor. Electric power for the latter is supplied through a grounded lead by a 35-kv. Onan generator mounted on the Link-Belt Speeder. The generator is belt-driven from the GM 371 diesel power unit of the dragline.

As noted previously, the materials removed from the cavities are pumped to an isolated portion of the pit. Water drained from the waste flows to a section of the quarry that has been excavated below the water table. Here it is picked up by the transfer pump and supplied to the high-pressure unit.

From the company's own observation, the excavator has been highly successful in removing clay and other materials from any cavity into which it can enter. In effect, there is a lower limit of an opening of 14 in. required, but there is no upper limit. The excavator will pass solids up to 1½-in. in size—it will suspend from 15 to 20 percent solids—and will excavate any material that can be broken down by the jetting action.

Another view of the excavator showing the probe well down in a clay-filled pocket. Material flushed out is being discharged through the line in the foreground.

Below: In this picture of quarry operations, a cross-section of some of the cleaned pockets is visible. Relatively soft, the rock has a high calcium content.

After the pockets have been cleaned, they are filled with available loose, clean stone from the top of the formation, preparatory to drilling and blasting operations. Drilling is accomplished with a jeep-mounted 4-in. auger with which the formation is readily penetrated. In normal operation, holes are sunk on a 12- by 12-ft. pattern. These are charged with 40 percent, 3½-in. dynamite that is detonated with Prima-cord.

While the rock lends itself to being broken down by either blasting or by plowing with tractor-drawn rippers, the latter is preferred if there is only a minor occurrence of fissures. After the cleaned area has been blasted, or ripped, the broken material is loaded out by dragline or shovel. Along with the machine used exclusively for operation with the Hydraulic Excavator, all draglines and shovels are Link-Belt Speeders, including LS-68, LS-98, and K-370 models.

Either of two methods is followed in handling the broken rock. Loading may be done directly to portable crushers in the quarry, with the crushed material subsequently hauled by Allis-Chalmers TR-260 end-dump units to linear stockpiles paralleling the quarry's rail loading spur. Pit-run material may also be hauled directly from the loading machine to the quarry to the stockpile area, to be subsequently fed to a portable crusher at that point prior to loading rail gondolas. While stockpiled materials may be rehandled by a clam-

John P. Edson, vice-president and general manager of Williston Shell Rock Company.

shell for direct rail loading, the pit-run material, when fed to the portable crusher by the spur, is discharged into the cars by the crusher's own discharge conveyor.

The portable crushers were designed and built by the Williston organization. Capacities range from 200 to 300 t.p.h. in either the two sizes produced. The primary crusher, a single roll unit with 3-in. teeth, reduces the feed to 3½-in. down to dust for the roadbase product. Stabilization materials are processed through a double-roll crusher in which they are reduced to 1½-in. down to dust. Depending upon the required volume of either product, the crushers may be operated separately, or in tandem.

In addition to the operations described above, rock is also excavated from below the water table. In this phase, holes drilled with the auger are charged with wax-dipped, 40-percent dynamite. Prima-cord is also preferred for this blasting operation. Prior to charging and stemming, the holes are flushed of fines by means of a pump which jets clear water into each hole.

Blasted materials are recovered from under water by a K-370 dragline with a 70-ft. boom and 1¾-cu. yd., medium weight Page bucket. The rock is loaded directly in TR-260 haulage units having rock bodies provided with drain holes, and is immediately transferred to the stockpile area. After drying, it is crushed in the equipment noted above prior to rail loading. Approximately 35 cars of finished material are produced daily.

Along with the three permanent quarrying operations, this active firm is usually engaged in producing from at least one temporary location. Two-way radio communication is available at all operations, with the permanent base station located at the Buda facility. Mobile units are installed in utility trucks and company automobiles. The radio installation at the Ocala office is utilized to co-ordinate the various activities.

James H. Craggs Jr. not only heads this progressive company, but is also the inventor of the unique and highly successful Hydraulic Excavator first used in his operations. Key personnel in the organization include John P. Edson, vice-president; and Leonard Brown, mine superintendent.

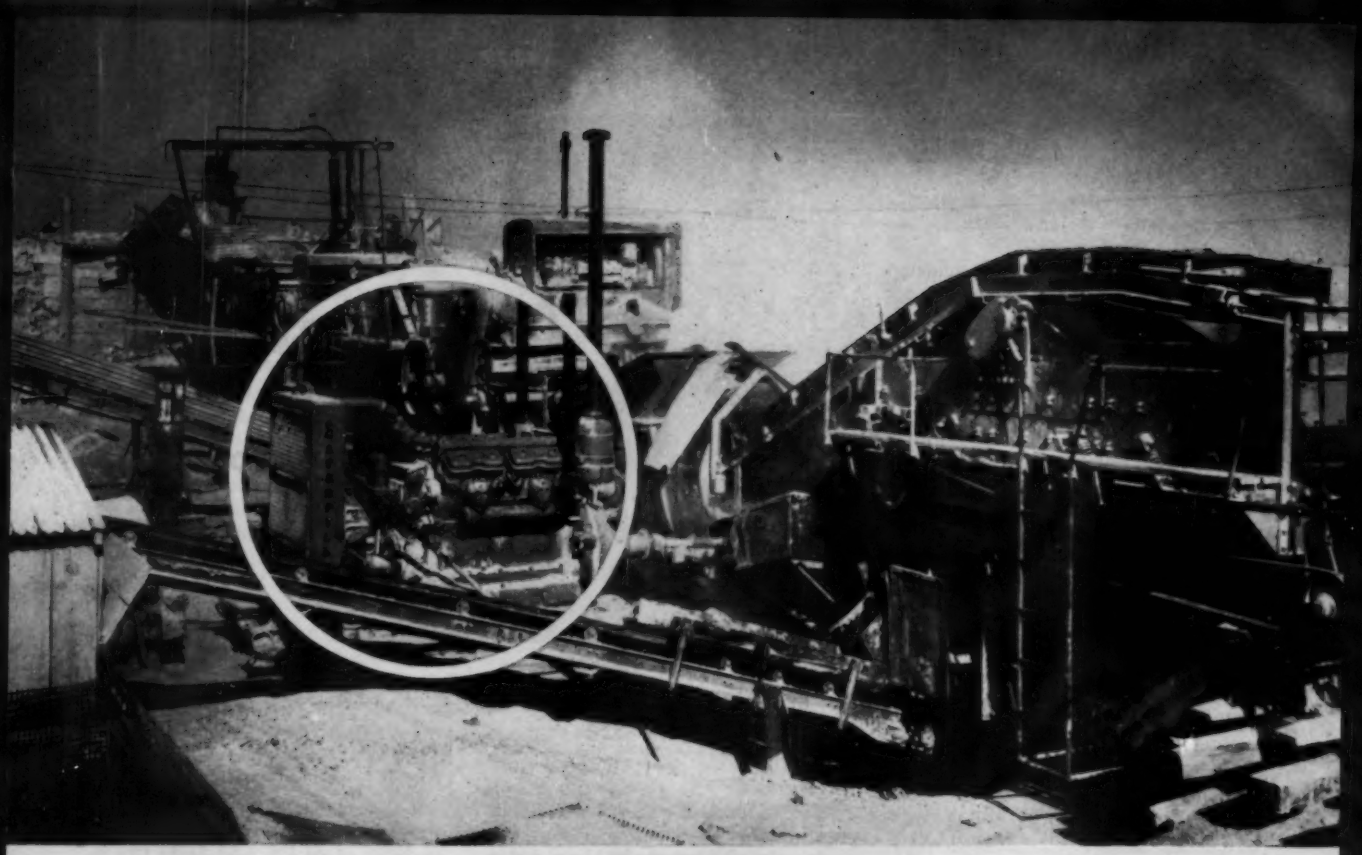
Pit-run material delivered to the stockpile area is shown being rehandled and fed to one of the portable crushers prior to loading. In the background is an end-dump haulage unit near a dumping point on a stockpile.

Fuller Succeeds Douglass In Allentown Portland Post

C. Thomas Fuller recently was elected chairman of the board of directors of the Allentown Portland Cement Company. He succeeds A. E. Douglass Sr., who continues as a member of the board and chairman of its executive committee.

Officers of the firm who were re-elected were F. A. Weibel, president; J. W. Fuller, vice-president; A. E. Douglass Jr., vice-president of operations; B. L. Weiss, vice-president of sales; E. D. Schuler, secretary and treasurer; and R. J. Yoder, assistant treasurer.

Herbert Abraham, chairman of the board of The Ruberoid Company, New York, N. Y., announced a net income of $4,292,143 for the year ended December 31, 1956. In 1955 net income was $4,511,351. Net sales for 1956 totaled $76,359,632, compared with $82,155,654 a year earlier.



120 TONS PER HOUR FOR ONLY 10¢ IN MAINTENANCE

This CAT* V-8 Diesel has cost only $2133 for repairs in 21,000 hours, including an overhaul after 20,000 hours. "Cat products, in our estimation, are the work horses in their field. They're easy to service and down time is less. We figure we've lost about four hours on our three Cat Engines in three years." Mr. E. B. Moubry, manager of the Aggregate Division of Standard Industries, Inc., and Lee Courtney, his superintendent, agree that this is the best performance one can expect. Standard Industries, Inc., of Tulsa, is a wholly-owned subsidiary of Tecon, Inc., Dallas, Texas.

This Cat, together with two smaller Caterpillar Engines, powers a Cedarapids portable crusher with an output of more than 1000 tons per nine-hour day of limestone and base materials. Thus repair costs have been only 10¢ per 120 tons produced. The two D13000s are veterans of 18,000 and 10,000 hours on the job.

This long and trouble-free work life is a Caterpillar tradition. The compact V-8 Cat retains new-engine efficiency over many thousands of hours, thanks to such Caterpillar features as foul-free fuel injection system, aluminum bearings and "Hi-Electro" hardened cylinder liners and crankshafts.

Efficient filtration is especially important in an engine that must work in dusty conditions in a pit or quarry. Years of research and development have gone into Caterpillar fuel and lubricating oil filters that keep out engine-wearing abrasive particles.

Leading manufacturers can supply Caterpillar Engines in their crushing and excavating equipment. And your Caterpillar Dealer can supply you with the rugged yellow diesel of your choice when it's time to repower. See him today for information on the full line of Caterpillar Diesel Engines up to 650 HP (maximum output capacity). He'll help you select the Caterpillar Engine that's built to do the most work over the longest period of time on *your* job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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MODERN
HEAVY-DUTY POWER

Fly Ash Sintering

new aggregate processing converts waste to useful product

By ANDREW J. KANTOR
Sales Engineer
Koppers Company, Inc.

TECHNICALLY speaking, sintering is a process in which air is passed through a loose bed of material containing a sufficient amount of fuel to burn and thereby consolidate the particles by thermal bonding. In other words, sintering is a specific method of combining or fusing together very fine particles of ferrous or nonferrous minerals and thus making the mineral more useful in the larger physical form. The method today is carried out by means of a sintering machine, which is fundamentally a traveling grate. The sintering machine is made up of groups of comparatively short grate bars, each group being supported and conveyed by an individual framework called a pallet. These pallets supporting the grate bars travel the periphery of the sintering machine while the material is being burned, and in this manner provide a continuous operation.

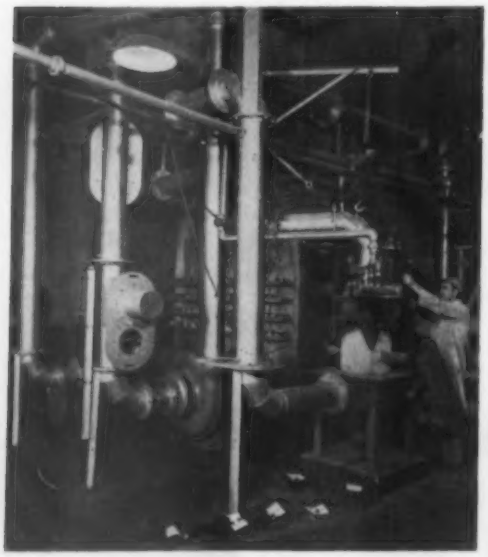
Sintering of ferrous and nonferrous minerals has been in progress over 30 years. Attempts were probably made long ago to sinter fly ash. However, to our knowledge, sintering of fly ash was successfully accomplished only a short time ago, in spite of the fact that fly ash disposal has been a great concern of the utility companies for a number of years.

As a result of inquiries received from various electric and fly ash disposal companies, Koppers Company, Inc., began a research and development program with the objective of sintering fly ash. This particular project was begun approximately a year and one-half ago in our Agglomeration Laboratory, and Koppers has taken steps before the U. S. Patent Office to protect the inventive features of this program.

In spite of our technical knowledge pertaining to sintering, a great number of sintering tests were conducted before a successful method was developed. After our method had been developed, a number of continuous sintering demonstrations were conducted on a laboratory model of an American Ore Reclamation sintering machine. These sintering demonstrations were conducted at different times in the presence of representatives from various electrical companies.

Before elaborating on some of the problems which were involved in the sintering of fly ash, we would like to mention that all technical data pertaining to fly ash sintering is based on the results of the many tests conducted by our Agglomeration Laboratory.

The physical characteristics of fly ash in its natural state presents a problem which must first be overcome before any attempt toward sintering can be made. The first problem is the fine texture of the individual fly ash particles, which restricts air passage through any appreciable depth of raw fly ash to such an extent that sintering is impracticable. This problem is overcome



Stationary pot used for trial sintering. On the floor in front of the apparatus can be seen samples of trial sintering.

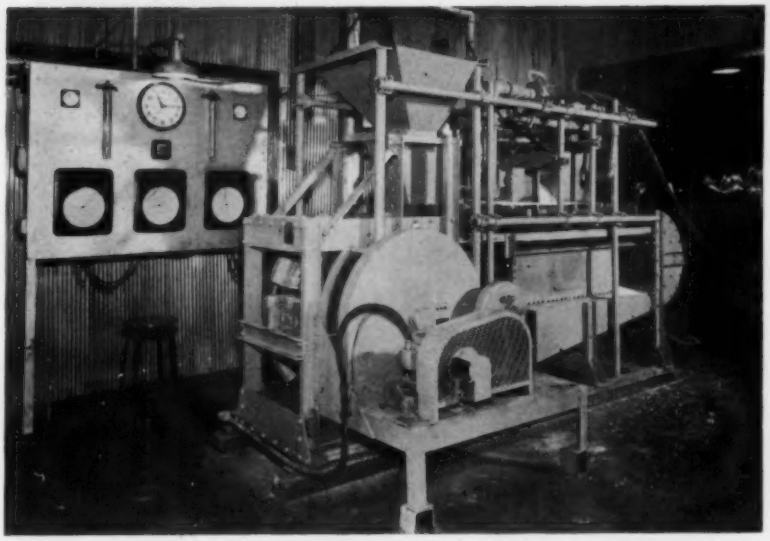
The double shaft pug mill, used to mix the ingredients before sintering.

by converting the fly ash into pellets. The size of the pellets can be uniformly controlled by mechanical means and will range in size from 1/16-in. diameter upward. However, if the pellet size exceeds ⅜ or ½ in. in diameter, the center of the pellets will not be sintered, and thus the percentage of fines may be increased beyond a desirable measure after the aggregate has been crushed.

Fly ash can be pelletized by merely adding the required amount of water to it and then passing the moist fly ash through either a disc-type or drum-type pelletizer. However, in order to produce pellets strong enough to maintain the pellet structure while being sintered, it becomes necessary to add a binder material to the fly ash prior to pelletizing.

Our laboratory has discovered suitable binder materials which, at the present time, cost approximately 1.2 cents per pound. In some sintering tests one binder is somewhat more suitable than another, but the necessary amount required of all binders is ½ to 1 percent of the total weight of the mixture. This will add approximately 15 cents to 25 cents per cu. yd. to production cost.

The approximate minimum carbon content necessary to support burning in fly ash is 3½ percent. Fly ash pellets containing 3½ percent to approximately 10 percent carbon tend to sinter individually and retain their individual pellet form after having been sintered. Another noteworthy fact is that fly ash containing higher percentages of carbon sinters into an intact cake uniformly channeled throughout and characterized by the copper coloring of the exposed surfaces.



One-cu. ft. pilot traveling grate sintering machine.

In cases where additional carbon is necessary to support burning, it can be added in the form of coke breeze or bituminous or anthracite coal. However, when bituminous coal is used as a fuel additive, a slight trace of yellowish-gray smoke is visible in the exhaust gases, a fact which may or may not warrant the use of additional equipment.

During our continuous sintering demonstrations, tests were made to determine the concentration of solid matter in the waste gas. Our tests show the waste gas to contain about 0.003 to 0.004 grains of solid matter per cu. ft. of gas. After passing through precipitators with 90 to 95 percent efficiency, typical stack gas emitted through a power plant stack will contain approximately 0.01 to 0.13 grains of fly ash per cu. ft. of gas, or 20 times the amount detected during our tests. Based on this evidence, it can be assured that dust-collecting equipment on fly ash sintering machines may not be necessary.

Fly ash is readily conveyed by

Right: The pelletizing mixer, also known as the drum pug mill. The mill provides a balling action, as well as mixing, which is favorable to the creation of maximum sintering permeability.

Below: Examples of mixture and sintered aggregate clinker before reduction.

bucket elevators, screw conveyors, belt conveyors, air slides, or pneumatic pumping equipment. In a fly ash sintering plant a screw conveyor would probably be preferable, to convey material from storage bins to mixing apparatus. Necessary quantity control could be better exercised and at the same time dust would be held to the minimum by employing the use of a screw conveyor. The most economical means of conveyance from the mining apparatus to the pelletizing apparatus would be a belt conveyor. Conveyance from pelletizer to sintering machine would also be best accomplished with a belt conveyor.

The amount of fly ash sinter produced per day per sq. ft. of grate area will range from 1½ to 3 tons. This seemingly wide production range is due somewhat to difference in carbon content in fly ash produced at different plants. The carbon content of the fly ash influences the weight of the sinter, which varies from 37 to 52 lb. per cu. ft.

In summarizing the foregoing facts, the basic equipment required for a fly ash sintering plant may be listed as follows:

Material bins—the number of bins depends on the character of the fly ash; *i.e.*, if extra carbon is necessary, or a mixture of fly ash and bottom ash is desired, more than one material bin is needed.

Pelletizing equipment—The number depends on the size of plant desired.

Conveyors to and from pelletizing equipment.

Sintering machine—The size depends on fly ash characteristics and the quantity of expected aggregate production.

Binder material bin—The number depends on the type of binder material used.

Sinter breaker—The necessity of the breaker depends on fly ash characteristics or plant requirements.

Fan, induced-draft—The size depends on the size of the sintering machine.

Other auxiliary equipment, such as material bin feeders, possibly a water tank and a fuel tank, would depend on existing plant location conditions. If it were found necessary to use fuel oil instead of gas for the ignition fuel, a fuel tank would have to be installed.

It is almost impossible to give cost estimates of equipment necessary in a fly ash sintering plant before conducting sintering tests with respective fly ashes, since the chemical and physical characteristics of the fly ash affects its sintering and pelletizing characteristics. In elaborating on this subject, it can be said that the size of a sintering machine necessary to produce a given amount of fly ash aggregate depends on the sintering rate of the respective fly ashes. If a fused sinter cake were desirable or if the fly ash had an insufficient amount of carbon, it would be necessary to install an extra material bin. If it were desirable to blend bottom ash with fly ash, it would again be necessary to add an extra material bin. A fused sinter cake would probably necessitate the installation of a breaker, whereas individually sintered pellets would not require a breaker. These facts serve to substantiate the fact that it is imperative to test the sintering characteristics of any fly ash before a responsible estimate can be compiled.

The following is an estimate of the cost of producing 1 cu. yd. of fly ash aggregate, based on a 1,900 cu.-yd.-per-day plant. The estimate includes only the cost of labor, material, and supplies:

Labor	$0.52/cu. yd.
Electricity	0.24/cu. yd.
Fuel Oil (ignition furnace)	0.10/cu. yd.
Fresh water	0.02/cu. yd.
Repairs and maintenance	0.10/cu. yd.
Binder material	0.25/cu. yd.
Total cost of labor, supplies, and material	$1.23/cu. yd.

It must be remembered that this total cost does not include administrative or other costs which may be incurred in the operation of a plant. Also, the cost of labor and material will vary from plant to plant, depending on location and size.

It may be interesting to note the following information on prices of lightweight aggregate in the New York City area; these are probably comparable to prices in other metropolitan areas:

Cinders delivered, 10 cu. yd. lots or more	$4.75/cu. yd.
Cinders delivered, carload lots	$3.75/cu. yd.
Lightweight aggregate "A," carload lots or boats	$4.85/cu. yd.
Lightweight aggregate "B," carload lots or boats	$5.15/cu. yd.
Lightweight aggregate "C," carload lots or boats	$4.40/cu. yd.

These prices were compiled about a year ago, and they may have increased slightly since that time.

In conclusion, I would like to mention that we have had cinder blocks made with fly ash aggregates, and laboratory tested for compressive strength. The results obtained by the testing laboratory showed the block to have a load bearing strength of 1,000 lb. p.s.i., which meets A.S.T.M. specifications for grade "A" cinder block. In addition to the cinder block, a batch of fly ash aggregate, crushed to minus ⅜ in., was tested by a leading testing laboratory for its concrete-making characteristics. The sieve analysis showed the aggregate to possess the proper gradation for concrete making. The strength ratio for the 7-day test was 99 percent of standard, which meets concrete-making strength specifications. Loss on ignition was 0.46 percent, as compared to a maximum of 5 percent allowed by A.S.T.M. specifications for structural concrete. The stain test showed 0.22 milligrams of ferric oxide per 200 grams of aggregate, which is classified by A.S.T.M. as very light, and a stain index of 20.

Based on actual facts, it may be assumed that aggregate from fly ash will eventually replace aggregates now being used in the concrete masonry industry. It could eventually replace the fast disappearing cinder supply now being used on highways throughout the country in winter months. Its light weight and insulating characteristic could make it useful in many other ways. In short, a fly ash sintering plant can now be regarded as a means of converting a costly waste product into a profitable commercial product.

Georgia Marble Company Announces Expansion Plan

Directors of Georgia Marble Co., Tate, Ga., have appropriated $1,400,000 to be spent on an extensive expansion program.

Included will be the modernization of machinery and expansion of plants and quarries located in Georgia, Alabama, Tennessee, Virginia, Missouri, New York, Massachusetts, and Vermont. The directors also authorized a 1957 advertising program to cost $108,000.

In order to expand its services to dealers and contractors, the Calaveras Cement Company, San Francisco, Calif., has appointed William G. Jeffrey as sales manager, and has set up two regional divisions under the direction of James Casey, former supervisor of contractor salesmen, and Jack Gordon, former contractor sales representative in Oakland.

Mr. Jeffrey has been manager of dealer sales since 1954.

OUTSTANDING PERFORMANCE

McKAY

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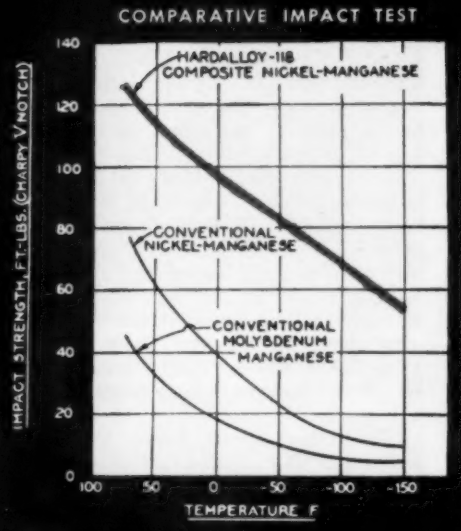

The Nickel Manganese Weld Deposit that takes a 180° Bend!

McKay Hardalloy 118, a composite Nickel-Manganese Electrode, combines *all* the properties of nickel-manganese electrodes—and more!

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For a Nickel-Manganese Electrode that deposits an extremely tough, wear-resistant alloy that can be used for build-up and *safe* joining of austenitic manganese or manganese to mild—get the full story about McKay Hardalloy 118 Low Hydrogen Electrodes.

Send for literature on McKay Hardalloy 118

HERE IS PROOF!

Test Specimen—½" Austenitic Manganese Plate Double V Joint

Unretouched photograph of bend specimen welded with Hardalloy 118 shows a full 180° bend without fissures or cracks appearing at the weld joint or in the deposited metal.

THE McKAY COMPANY

Vancouver Firms Barges Unload 600 BBL. per Hour

AS PART of the growing trend toward bulk cement distribution by water carriers, Gilley Brothers, Ltd., Vancouver, B. C., has introduced a self-unloading cement barge, the first of its type in the area. It is the first of two barges being constructed for Gilley by Yarrows, Ltd.

The new 4,500-bbl. barge unloads cement at an average rate of 450 to 600 bbl. per hour, depending upon local conditions and transport distance. The barge is completely self-contained with all loading equipment and necessary facilities on board. Using Fuller-Huron Airslide fluidizing conveyors and a Fuller-Kenyon stationary pump for unloading, the barge provides transport of bulk cement to on-shore facilities.

The barge, of all-welded steel construction, is 105 ft. long, 38 ft. in the beam, and 10½ ft. deep. Cement is stowed in four V-bottom hoppers, and pneumatically loaded by Fuller-Kinyon pump at the cement mill through an 8-in. transport line running above the hoppers. Even distribution of cement load is assured by three transport line diverting valves above the roof.

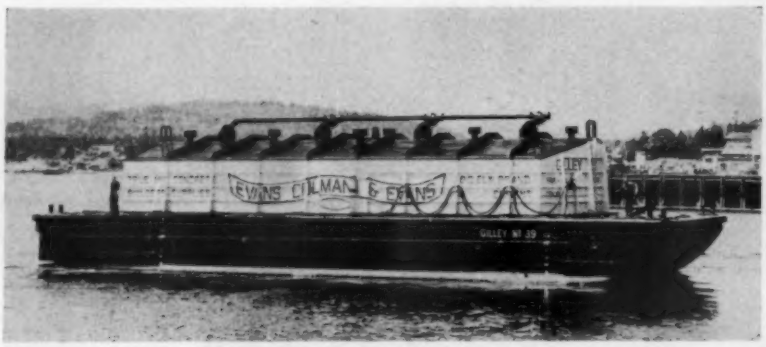
The bottom of each hopper is fitted with a 10-in. open-type F-H Airslide fluidizing conveyor reposing at an 8-deg. angle. Activating air, controlled from the machinery compartment, is provided by two 15-hp. rotary blowers. Air distribution to each section is controlled by a butterfly valve. The Airslides consist of rigidly mounted porous fabric. When 2½ to 3 p.s.i. of compressed air is introduced through the fabric, the cement flows like liquid.

In the unloading operation, cement from the hopper Airslides is transferred to the Fuller-Kinyon pump *via* 10-in. enclosed Airslides. Flow gates regulate the flow from any quadrant, enabling the operator to control the trim and heel of the barge, if necessary. Cargo discharge requires the part-time attention of only one operator.

A single-stage 150-hp. Fuller rotary compressor provides air at 30 p.s.i. to the aerating chamber of the F-K pump. Cement is pumped through an 8-in. discharge line to shore storage.

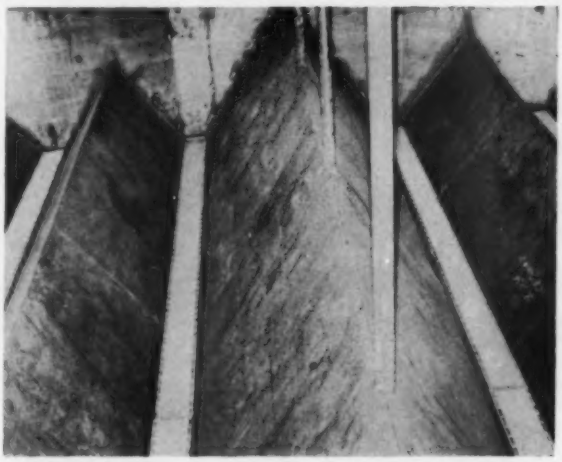
All equipment is arranged to operate on 440 v., a.c., and connections for shore power are provided.

Large ventilators on the bargehouse to prevent the build-up of pressure during unloading. Inspection manholes are fitted to enable the operator to break up any build-up of cement during loading.

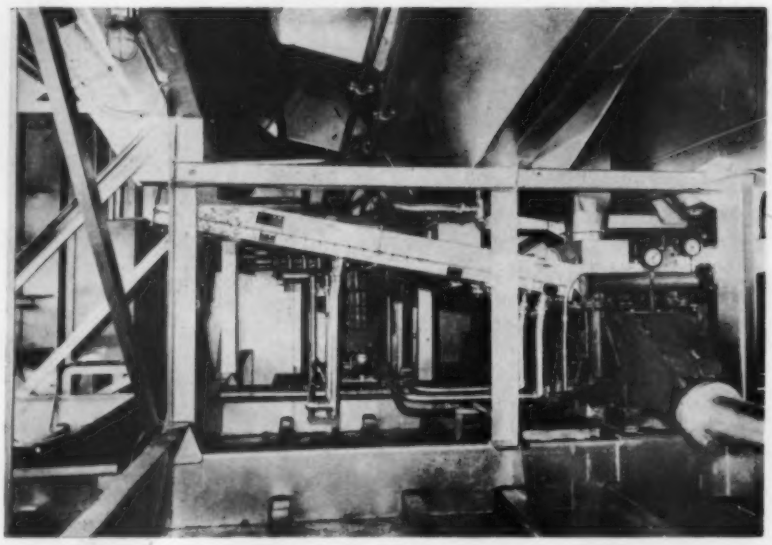


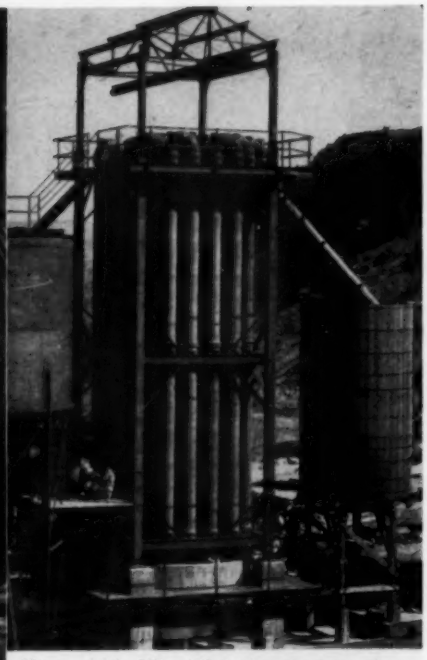
Gilley Brothers' No. 39 cement barge. Atop the barge can be seen the loading line, with three diverting valves. These valves serve to load the cement evenly.

An overhead view in the hopper compartment. The cargo space has four hoppers running the length of the barge. At the bottom are 10-in. open-type air-activated conveyors.



The enclosed conveyors beneath the hopper compartment, installed at an angle of 10 degrees, convey fluidized cement to the pump at the right, which conveys it through an unloading line to on-shore storage.





Above and left: 36" x 20" Kue-Ken at mercury mine

Self-lubricating KUE-KEN® *Crusher runs cool all day under full load*

Low bearing pressures and enclosed oiling system are your guarantee of lowest operating cost

Kue-Ken is the only crusher with a built-in lubrication system complete with pump and filter and sealed to keep dirt and grit out. No grease cups or fittings. This thorough lubrication permits more crushing strokes per minute and makes Kue-Ken the highest capacity crusher size for size. See in the chart below how a Kue-Ken will supply the capacity you need in a smaller size crusher and use less horsepower. Also, you get at least 5 times longer jaw plate life. Automatic flywheel release prevents damage from overload or tramp iron. Kue-Ken is the most economical crusher to maintain, and the most profitable to operate.

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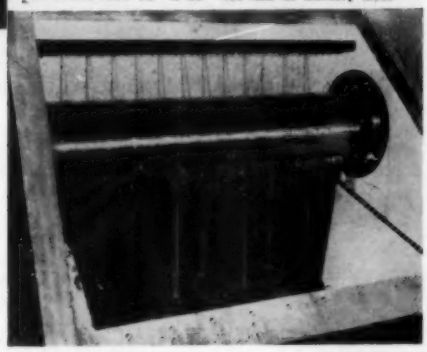

Above: Cover removed showing clean, filtered oil pouring down over shaft, bearing and toggles. With this positive lubrication, machined parts maintain their original micrometer tolerances for the life of the crusher. Only periodic oil changes are required.

Table of tons per hour that will pass through crusher with jaws set at dimensions shown when measured in the closed position.

Table is based on crushing average hard, dry quartz or similar rock weighing at least 100 lbs. per cubic foot when crushed.

Kue-Ken crusher size	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	5"	6"	Horsepower range
24" x 12"	22	26	32	36	43	50	56					15 to 30
30" x 12"	32	35	38	42	55	70	76	85	110			20 to 30
36" x 10"	38	47	57	67	80	91	105					25 to 40
36" x 20"					70	82	90	115	135	160		30 to 50
42" x 25"					90	120	150	165	180	215	250	40 to 60

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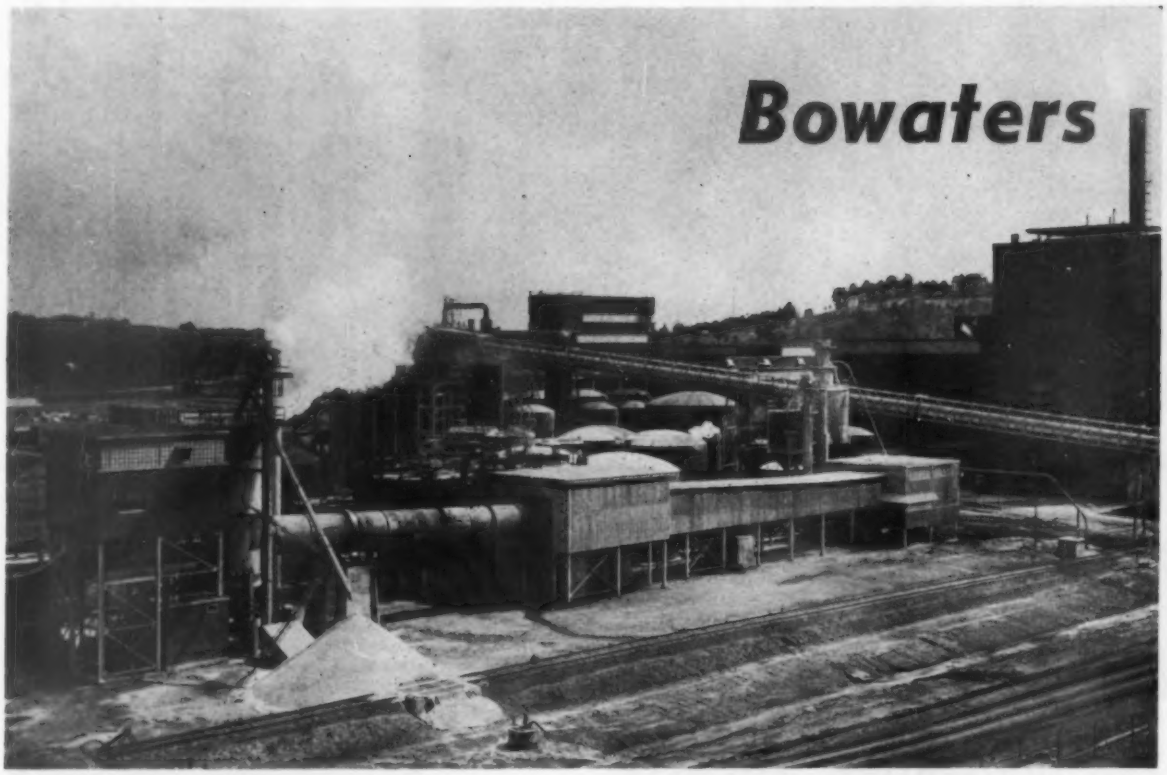
Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England



An overall view of the lime kiln and causticizing area at the impressive Bowaters Southern newsprint mill near Calhoun, Tenn. The kiln is fed both lime mud, recovered from the causticizing process, and raw limestone for makeup. Raw stone handling facilities are seen at the left.

ANOTHER ON THE SPOT REPORT

SOMEWHAT obscured by the complexity and preeminence of its surroundings, the lime recovery phase of the Bowaters Southern Paper Corporation pulp and paper mill at Calhoun Tenn., is a significant and critical feature in the overall pulp processing of this new facility.

An unusual feature of this new mill lies in its description as being one of the few such operations in this country in which raw limestone is added to the kiln feed for makeup of lime lost in the causticizing circuit. In most instances, only the lime mud recovered from the latter operations is calcined, and purchased lime is added to provide the total amount needed in the flow.

Erected at a cost of $60,000,000, and reported to be the largest newsprint mill built in this country in more than a quarter of a century, the Bowaters plant was placed in operation in July, 1954, with an initial design capacity of 130,000 tons of newsprint and 55,000 tons of sulphate (kraft) pulp annually. Subsequent expansion, costing $30,000,000, already has resulted early this year in a capacity of approximately 300,000 tons of newsprint, and more than 50,000 tons of saleable pulp for export.

The new plant represents a joint Anglo-American venture, and the largest investment by British industry in this country since the end of World War II. Bowaters Southern was formed as a subsidiary of the parent British company, an international organization of some 45 companies with 10 pulp and paper mills in England, Ireland, Norway, Sweden, Newfoundland, Nova Scotia, and now, the United States.

Evidence of the significance of the new mill to newsprint and other paper consumers in this country—which imports more than 80 percent of its newsprint—is the fact that the mill's entire output for the next 15 years has already been sold to Southern newspaper publishers in 142 cities among 17 states.

For many years Bowaters has supplied newsprint to American newspapers, particularly Southern ones, from its Corner Brook mill in Newfoundland. When it was decided to build a mill in this country, selection of the site was dependent on several critical factors, including: availability of rail, highway, and water transportation; cheap and abundant power; plentiful water supply; an economic source of fuel—coal, oil or natural gas; and above all, an adequate supply of suitable wood. It was also necessary that these factors be present in a well-populated area from which manpower requirements could be met.

A survey of potential areas, initiated in 1947, culminated in the selection of the Calhoun site as the ideal location. Not only has it fulfilled all the foregoing requirements; but also places the new mill in a highly favorable relation to the Southern area in

Southern Paper Corp.

lime basic to operations in huge newsprint mill

By BUREN C. HEROD

which the parent company has developed the bulk of its United States market.

Daily capacity of the new Calhoun mill is approximately 650 tons of pine groundwood and 450 tons of kraft pulp. A total volume in excess of 1,400 cords of pine is used each day —about 40 percent groundwood and the balance kraft. Until recently, it was thought that the resinous nature of Southern pine precluded its use in the manufacture of newsprint. However, research developed methods of pitch control on this wood that make it an important raw material for the newsprint industry.

Duplicate systems for handling logs provide for segregation of those suitable for mechanical pulping (groundwood) from those destined to enter the chemical, sulphate (kraft) process. The first split is made at the barking drums, and from that point on the two types follow their individual flows. Subsequent to final pulping, the two materials, along with certain other constituents of the final paper product, are proportioned prior to entering the paper machines. Only a part of the kraft output is used in the manufacture of newsprint, the balance being dried, baled, and exported to other Bowaters mills.

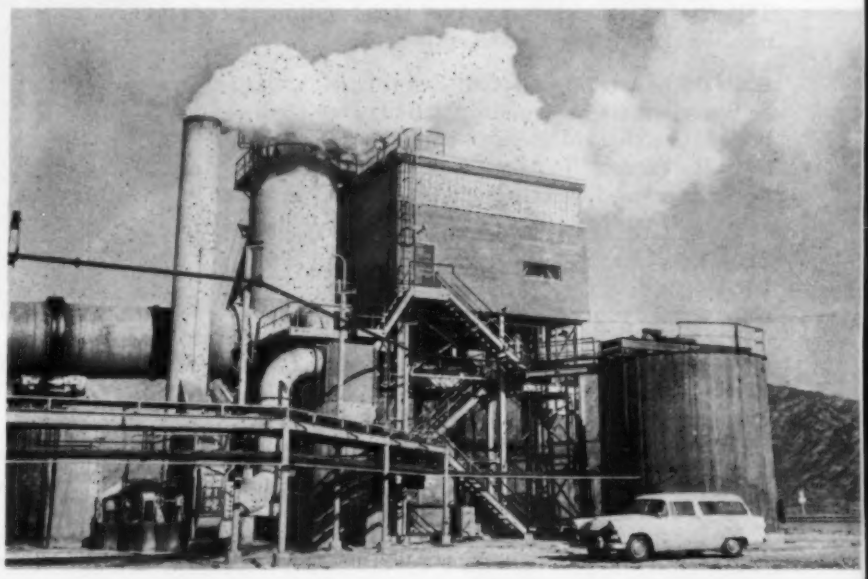
In kraft production, over 130 tons of lime are required for causticizing with the following conventional systems: green liquor clarification, dregs washing, lime slaking, white liquor clarification, and lime mud washing. Over 90 percent of this lime requirement is met through the lime mud recovery and calcining system, which incorporates a 9- by 250-ft. rotary kiln while the balance is obtained from makeup by adding raw limestone to the kiln feed.

Both the pulping process and lime recovery are closed-circuit operations overlapping each other in the liquor recausticizing phase. Design capacity provides for 36,000 cu. ft. per day of white liquor, although the plant can be operated up to a capacity of 43,000 cu. ft.

The chemical pulping process at Calhoun begins with the cooking of Southern pine wood chips in a battery of digesters. Spent cooking chemicals, black liquor, are subsequently treated to produce a solution of sodium carbonate and sodium sulphide, or green liquor. This solution is pumped into a clarifier from which the residue is sent to a dregs washer and the clear green liquor to a storage tank.

From the latter, the liquor is pumped to a set of slaker classifiers where lime is added and the recausticizing action is begun. The slakers overflow to a series of causticizing tanks where the reaction is brought to equilibrium. Causticized solution flows to a white liquor clarifier, and the overflow from that unit is

This view of the kiln feed end shows the lime mud surge tank (right), the structure housing the drum filter and related equipment, and the raw stone feed tank at the end of the kiln.



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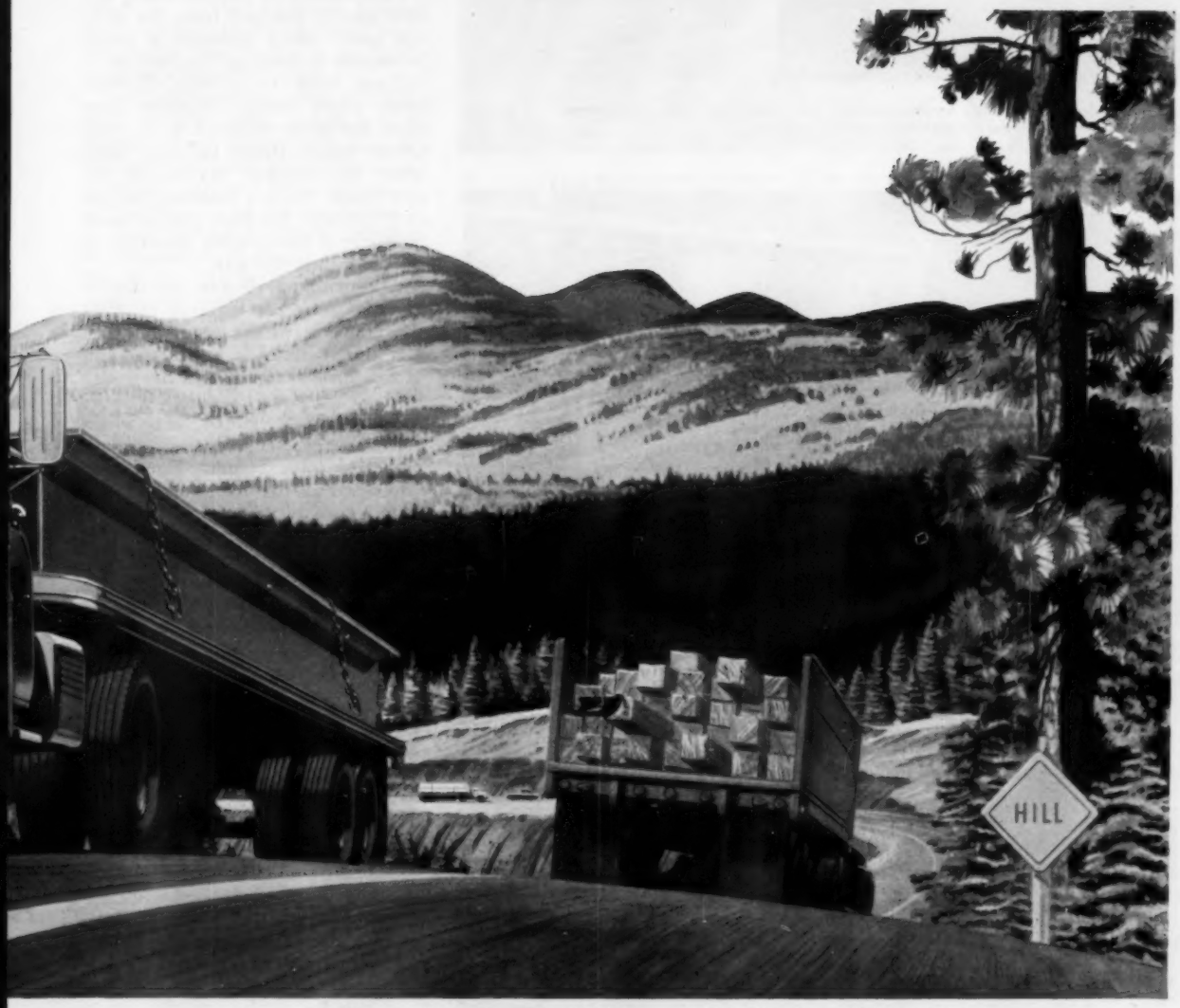

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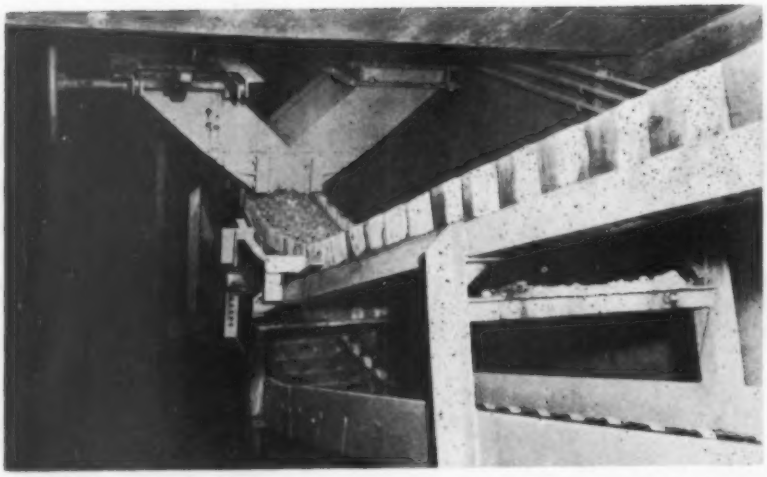
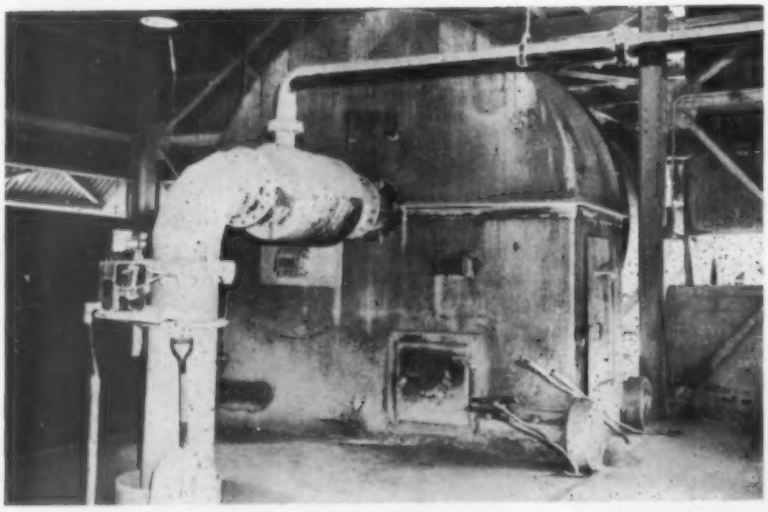
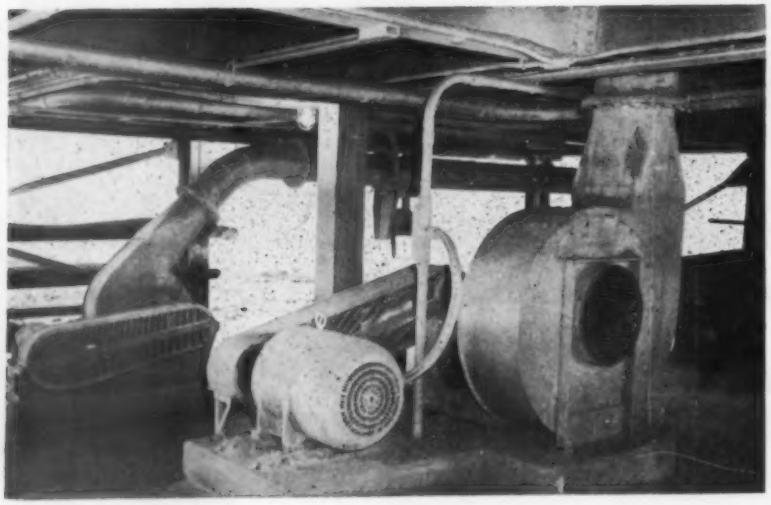


Stockpiled stone is recovered by this conveyor in a reclaiming tunnel, transferred to a bucket elevator, and raised to the kiln stone storage and feed bin.



The firing end of the 9- by 250-ft. rotary kiln. Daily consumption of natural gas totals about 1,000,000 cu. ft.



These primary and secondary air fans, rated at 8,500 and 2,500 c.f.m., respectively, are located below the firing door.

pumped to the white liquor storage tanks for the digesters in closing the liquor circuit.

The green liquor clarifier and dregs washer are of the single-tray type, while the white liquor clarifier and lime mud washer are multiple-tray units. Mud from the white liquor clarifier is transferred to the latter washer for removal of most of the remaining caustic soda, and the resultant $CaCO_3$ sludge is then pumped to a 50-ton capacity kiln feed storage tank equipped with a Dorr paddle agitator.

Consisting of 40 percent solids, the lime mud is pumped from the storage tank, which provides a surge protection in keeping kiln feed on a uniform basis, to a 36-in. Traylor ferris wheel feeder. Primary flow from the latter enters a 6- by 8-ft. Oliver rotary drum vacuum filter, while the overflow returns to the surge tank. With a moisture content of 55 percent, the filter cake is transferred by a 16-in. screw conveyor to discharge into the kiln.

Approximately 9 tons per day of makeup stone are required to offset the lime lost in the recovery cycle, and this material is fed to the kiln at a controlled rate to join the sludge feed. Raw-stone-handling facilities include a track hopper, drag chain conveyor, bucket elevator, storage bin, and table feeder. Equipment and design of the limestone-handling system was furnished by Link-Belt, who also supplied a large part of the log-handling systems of the mill.

With required analyses of 96 to 97 percent or better $CaCO_3$ equivalent, low silica content, and a top size of 3/4 in., the raw limestone is acquired from two sources—Williams Lime Manufacturing Company, Knoxville, Tenn., and Southern States Lime Corporation, Crab Orchard, Tenn. Delivered to the Calhoun plant site in rail shipments of about 5 cars per month, the stone is discharged into the track hopper.

An 18-in. drag bar conveyor in a reclaiming tunnel transfers the material to the boot of a 64-ft. bucket elevator in which it is raised to a 12-ft. diameter by 18-ft. storage tank. Capacity of this conveying and elevating equipment is about 10 t.p.h.

When the 47-ton capacity storage tank is full, the bucket elevator discharges to a chute which drops the stone to a ground storage pile above the reclaiming tunnel. It is subsequently reclaimed through draw

gates and chutes in the tunnel onto the above drag conveyor. Kiln feed stone is drawn from the storage tank onto a 2-ft. diameter table feeder, from which it is chuted into the kiln. Raw stone and lime mud filter cake are separately fed to the kiln; and in the event the screw feeder for the mud is down, the table feeder rate can be increased to accommodate requirements.

Riding on four tires, the 9- by 250-ft. Traylor kiln is mounted with a slope of ½-in. per lineal foot. Drive at a maximum of 1.33 r.p.m. is provided by a Westinghouse 4-speed 60-hp. motor. An International Harvester UD 264 engine is available as an auxiliary kiln drive.

Calcining temperature in the kiln, which is fired with natural gas, is maintained at about 1,800 deg. F. With approximately 10,000,000 B.t.u. consumer per ton of lime, about 1,000,000 cu. ft. of gas is used daily. A chain curtain system is installed in the initial 46 ft. length at the feed end of the kiln to facilitate sludge breakup and calcining. The hot zone is lined with 70 percent alumina refractory brick.

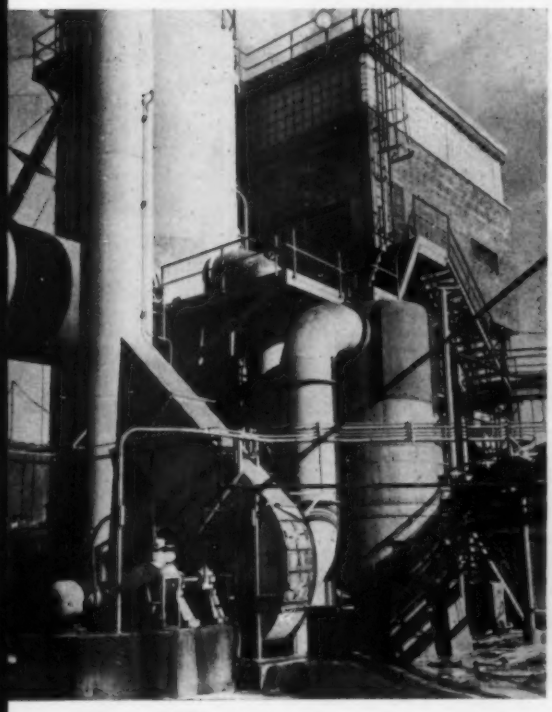
A Leeds & Northrup control panel, along with Hays Corporation and Foxboro Company recording and indicating instruments provide for close control of calcining operations. Buffalo Forge fans provide primary and secondary combustion air. For primary air an 8,500 c.f.m. size 45 fan, driven at 1,714 r.p.m. by a 30-hp. Westinghouse motor, is used. Secondary air is furnished by a 2,500 c.f.m. size 25 unit, driven at 2,480 r.p.m. by a 7.5-hp. motor.

The control panel and operating instruments for the kiln are housed in this compartment on the firing floor.

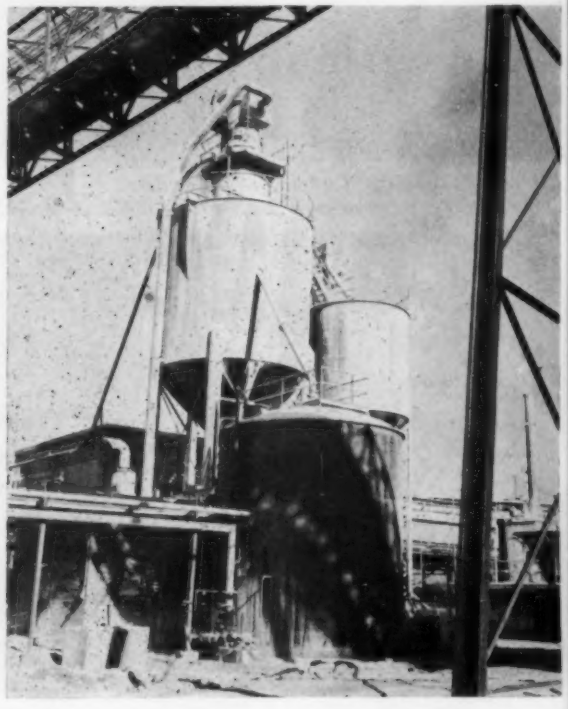
Exhaust gases leaving the feed end of the kiln are passed through showers in the Traylor dust chamber prior to entering a Peabody Engineering Corp. 7½- by 20-ft. gas scrubber. A 45,000 c.f.m. size 10 Buffalo Forge fan, driven at 982 r.p.m. by a 75-hp. Westinghouse motor, provides induced draft for the gases drawn through the dust chamber and gas scrubber and exhausted through the 4½- by 50-ft. stack.

From feed to discharge, the calcining cycle covers a period of approximately 4 hours. Lime discharge from the kiln is received on an enclosed 29-ft. drag conveyor and

(*Continued on page* 146)



Left: Induced draft for the kiln exhaust gases is provided at 45,000 c.f.m. by the fan at the center. After passing through showers in the dust chamber, the gases are drawn through the scrubber (right) before entering the stack.



Right: Storage tanks for reburned and fresh lime. The latter is purchased for pulp bleaching operations.

Colorado White Marble Processed for Lime, Hydrate, Varied Products

ANOTHER ON THE SPOT REPORT

DEEP in the Colorado Rockies, near the foot of Snow Mass Peak, occurs one of the finest white marble deposits in existence. Since 1896, when a quarry was first opened, slabs of this stone have been cut and polished, ultimately to find their way into many of the country's notable structures and monuments, such as the Lincoln Memorial and the Tomb of the Unknown Soldier.

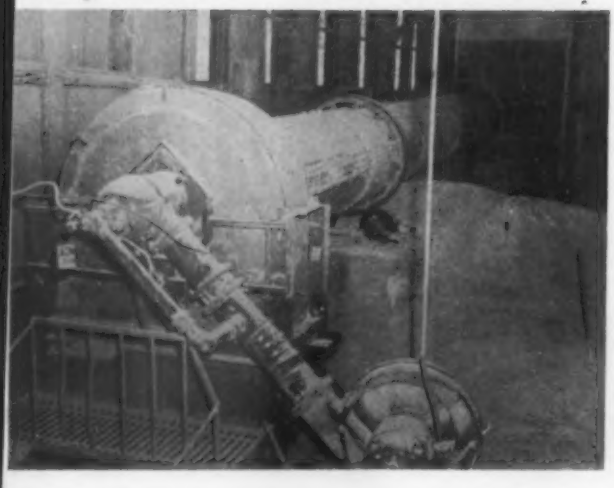
But the market for dimension white marble has progressively decreased, while industry is demanding ever-increasing tonnages of lime and limestone products. Thus, the calcite stone from the Marble, Colo., quarry is today almost exclusively employed in supplying the needs of the Glenwood Springs processing plant of Basic Chemical Corp.

By HARRY F. UTLEY

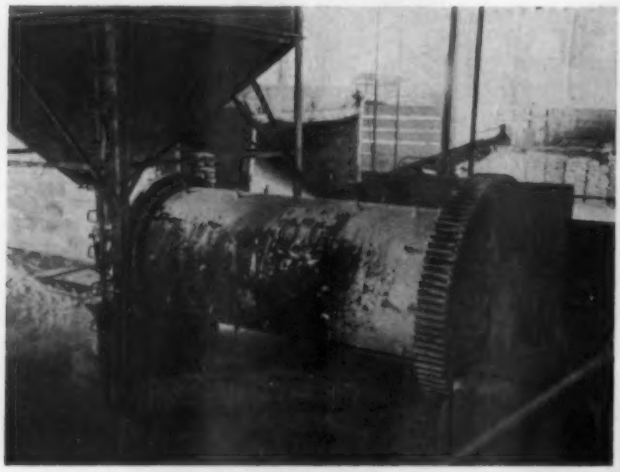
B. J. Cross, chemist, and Carl L. Morris, president, Basic Chemical Corporation, Glenwood Springs, Colo.

End products at Basic Chemical include high-calcium lime and hydrate, as well as a score of crushed and ground stone products ranging from ¾ in. down to minus 325-mesh in particle size. Although the stone is of high purity and excellent analysis, its most noteworthy quality perhaps is its extreme whiteness. This feature is capitalized upon by the firm. Trademarks for its various products include such brand names as "SnowRoof" (roofing rock and granules); "TruWhyte" (paint and pigment extenders); and "SnowMass" (hydrated lime).

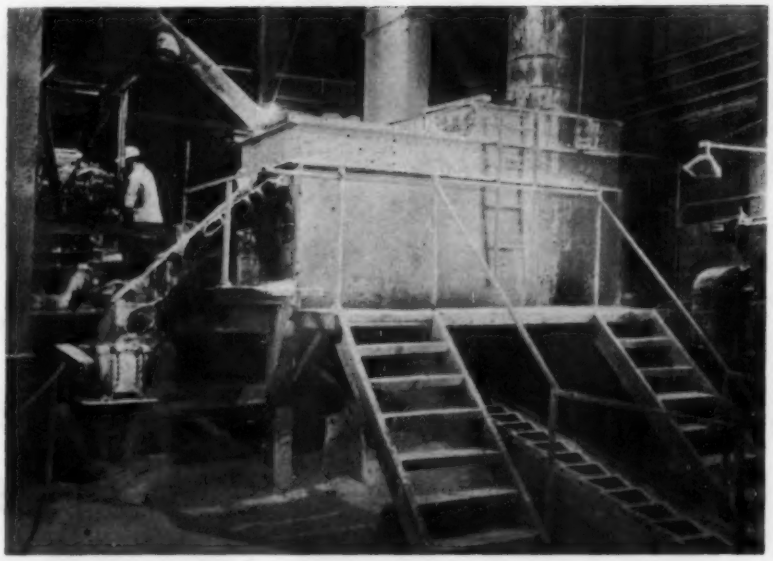
Below, left: The 4- by 60-ft. rotary lime kiln is served by a dual-purpose burner which can handle either fuel oil or natural gas.



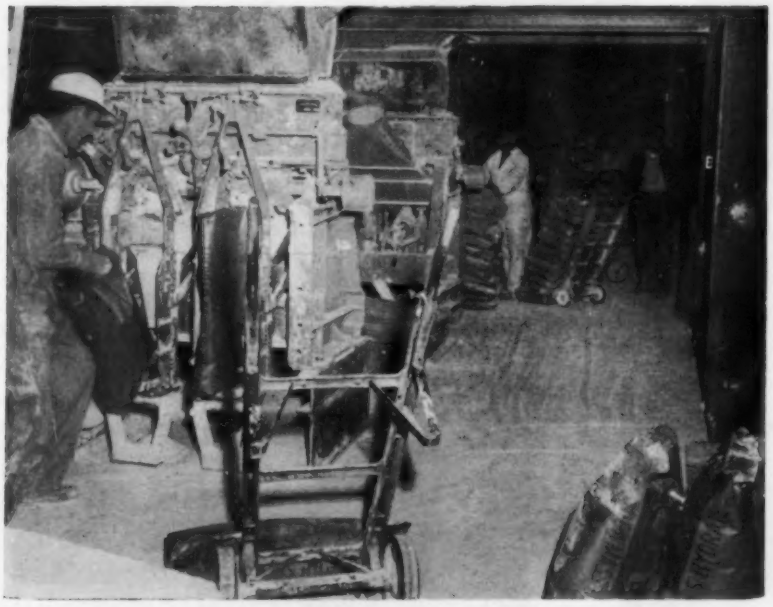
Below: Much of the white marble product is ball-milled to extreme fineness. The mill is charged with 8 tons of ½- to ⅞-in. steel balls.



Right: The hydrator is of the pug-mill overflow type and has a capacity of about 4 t.p.h. The drag-chain conveyor between the stairs cools the quicklime as it conveys the hot material to storage from a soaking chamber beneath the discharge end of the kiln.



Below: Two valve baggers are used to sack the various lime and limestone products before shipment.



Head of the concern is Carl L. Morris, who resigned from an important and lucrative executive position in the commercial lime industry in December, 1952, to form Basic Chemical, to finance and acquire the 1,600-acre marble deposit, and to equip the plant at Glenwood Springs. Production and marketing of the various products really got into high gear only last year.

The statuary-grade marble is dense, homogeneous, without pronounced cleavage, and has a specific gravity of 2.74. In acquiring the property the company also took over more than 100,000 tons of dimension-stone rejects. Consequently drilling and blasting initially has been at the minimum. A drop ball breaks up the slab scrap into sizes which can conveniently be fed into a 24- by 36-in. Pioneer jaw-crusher set up a short distance from the quarry.

Minus 4-in. crusher-run product is carried by a 36-in. by 180-ft. inclined belt-conveyor to a 42-in. by 8-ft. Universal double-deck screen to permit separation into three sizes—plus 1½ in.; minus 1½ plus ¼ in.; and minus ¼ in. These are separately stored in a 100-ton 3-compartment truck-loading bin which is used to load 20-ton carriers owned and operated by a contract-hauling firm. The trucks deliver to the Glenwood Springs plant 42 miles distant *via* state highways No. 82 and 133.

Housed in a brick building formerly used by the D. & R. G. W. Railroad, the Glenwood Springs plant receives the broken marble by way of a ramp where the delivery units dump their loads to a concrete surge hopper.

From the hopper, a reciprocating feeder regulates the flow of stone to a 36-in. by 55-ft. Link Belt pan-conveyor, thence by belt-conveyor to a Williams NF30 hammermill. A workman stationed at the transfer point picks out any undesired stone, trash, or tramp material. The hammermill is operated at low speed (640 r.p.m.) and the grid bars are spaced at ¾ in. to effect a rough balance of the sizes desired. Mill product is carried by a 50-ft. Link Belt chain-bucket elevator to the screening floor overhead.

Mechanical sizing of the stone is accomplished by a 42-in. by 8-ft. Universal double-deck screen, followed by a 4-deck Gyro-Sifter. The first screen takes out plus ½-in. minus ¾-in. and plus ¼-in. minus ½-in. sizes, which are binned. The former is sold largely as terrazzo aggregate, while stone in the smaller range finds its principal use as roofing granules.

Minus ¼-in. throughs comprise feed to the rotary lime kiln, or these fines may be sized wholly or partially by the Gyro-Sifter. Carrying 10-, 16-, 30-, and 80-mesh cloth, the four decks make very accurate separations

(*Continued on page* 137)

One of the two 6-ton haulage units coming out of one of the mines.

Marble Products

new plant produces roofing granules terrazzo, chips agstone

By WALTER E. TRAUFFER

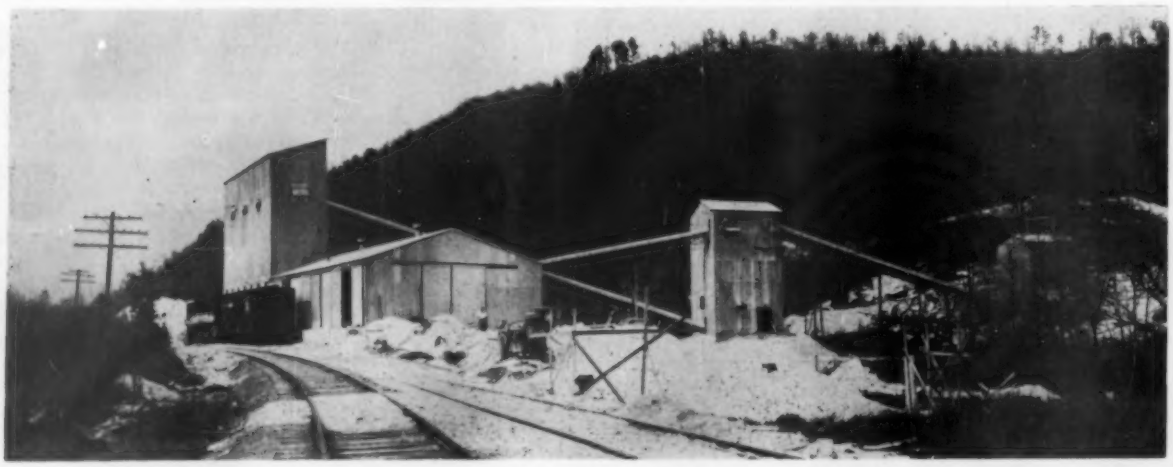
ANOTHER ON THE SPOT REPORT

THE Marble Products Company of Atlanta, Ga., in 1954 embarked on the ambitious project of producing at Whitestone a wide variety of marble and dolomite products, including roofing granules, terrazzo, marble chips, agstone, etc. After thorough prospecting a plant was built ¾ mile south of Whitestone, which is 75 miles northwest of Atlanta. This plant has a capacity of 10 cars or 500 tons per day for a range of sizes from ½ in. down. It is a flexible operation and can be shifted from one type or size of material to another very quickly. When dolomitic stone is being produced, 30 to 35 percent of the output is agstone.

The various sites being developed total 480 acres, either owned outright or under lease. Prospecting is done with a Joy diamond core drill. The aim in opening and developing various workings is to locate the best and most accessible materials, so that drilling and blasting can go on in one while loading is done in another. The No. 1 and 2 mines, about 300 ft. from the plant, are in a crystalline calcium marble which is used for roofing and terrazzo products. The No. 3 mine is an inclined entry operation in dolomitic marble about ⅜ mile from the plant. The No. 4 mine, about ½ mile from the plant, is in dolomite and is used for terrazzo and agstone. The No. 5 and No. 6 mines are underground operations in calcium marble. The No. 7 mine is an open quarry in calcium marble. The overburden has been removed, and quarrying operations are in progress.

All of the mines are room-and-pillar operations with staggered openings. Headings of 30 to 35 ft. are

(*Continued on page* 106)



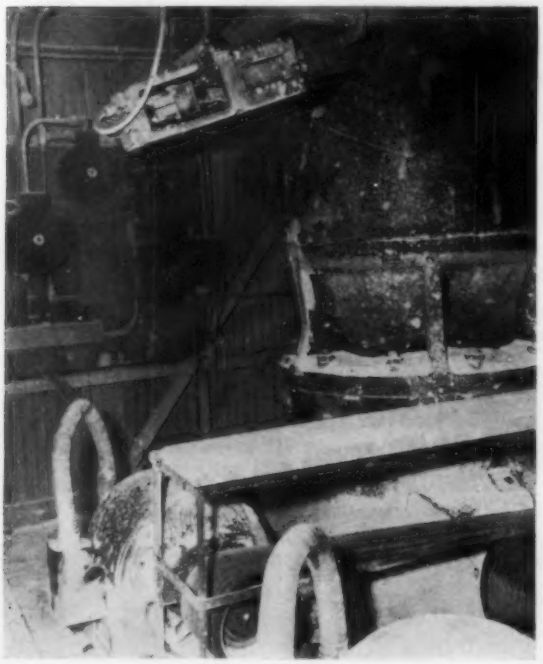
A general view of the Marble Products Company plant at Whitestone, Ga. The primary crushing and scalping building is in right background.

in Georgia

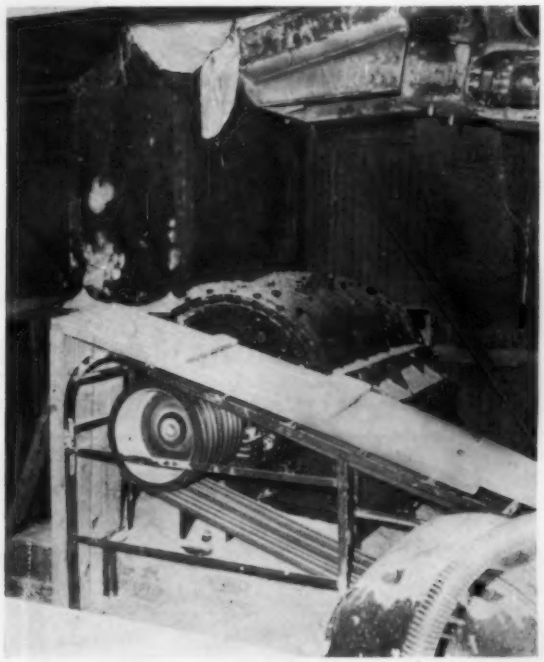
Above: The 24- by 36-in. roller-bearing primary jaw crusher with its 3- by 10-ft. apron feeder above.

Above: The first of three 4- by 10-ft. 3-deck scalping screens from which oversize goes to reduction crushers.

Below: The TY24 gyratory reduction crusher with its vibrating feeder above. This reduces to ¾-in. minus.

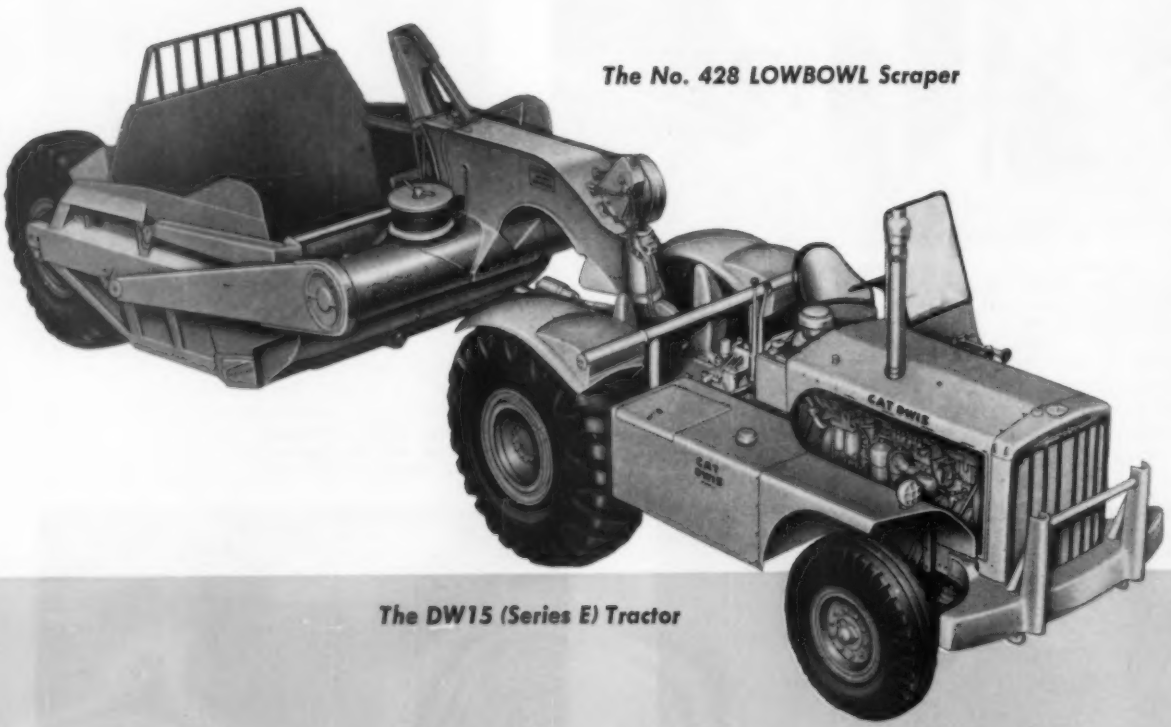


Below: The No. 3040 hammermill, also used for reduction, with its vibrating feeder above. This unit reduces to ⅝-in. minus.



CATERPILLAR ANNOUNCES

NEW DW15 (SERIES E) AND NEW No. 428 LOWBOWL SCRAPER



The No. 428 LOWBOWL Scraper

The DW15 (Series E) Tractor

Here's a new Cat team loaded with features that add up to one thing—A HIGHER PRODUCTION RETURN ON YOUR INVESTMENT. See your Caterpillar Dealer for details on this great team's performance.

GET THE STORY IN BRIEF ON THE OPPOSITE PAGE ▶

A GREAT TEAM: The performance of the DW15 (Series E) Tractor and No. 428 Scraper can be summed up simply: bigger loads—faster.

FACTS ABOUT THE DW15 (SERIES E) TRACTOR

Around the world, the DW15 has proved that it can move material faster and more profitably than competitive machines in its class. Now there's a new DW15 (Series E) to give you even higher production. This is the story:

ENGINE: A new Caterpillar D326 Engine, designed especially for the DW15 (Series E), develops 200 HP (maximum output capacity).

And Caterpillar research has produced a 23% torque rise in this new engine! This means that high tractor rimpull is maintained through a wide range of travel speeds in each gear, and the need for gear changing is decreased. In fourth gear, for example, over 3,000 pounds of rimpull are delivered at travel speeds from 9 MPH all the way to 18 MPH. A new engine, yes—but with these traditional Caterpillar advantages: uses inexpensive No. 2 furnace oil without fouling; needs no fuel system adjustments; requires no cleaning of fuel injection valves.

TRAVEL SPEED: The DW15 (Series E) offers ten speed selections, from 2.7 to 37.2 MPH. But, more important, it provides four-wheeled sure-footedness—*the ability to use the speed on the job.* Operators ride with more comfort, feel greater stability. They travel faster, and in safety.

MANEUVERABILITY: Four-wheeled stability means faster cycle time because the DW15 (Series E) can make short radius turns at higher speeds. It can turn without stopping inside a 35-foot diameter and in a smaller area through use of a turn-back-turn maneuver.

VERSATILITY: The DW15 (Series E) provides versatility that far surpasses similar sized two-wheeled machines. It can be unhitched from its scraper and used as an independent unit to tow compactors, water wagons or other units, and it can be teamed with the Athey PR15 Wagon for rock hauling work.

FACTS ABOUT THE No. 428 LOWBOWL SCRAPER

CAPACITY: Struck—13 cu. yd.; heaped—18 cu. yd.

ADVANCED DESIGN: There is more to Caterpillar's exclusive LOWBOWL design than a low bowl profile. Width and length proportions are designed to give maximum loading efficiency. And every component—particularly the apron, ejector, cutting edge—is likewise designed to do its part in achieving capacity loads.

LOADABILITY: The final result of this careful engineering is this: bigger loads—faster. LOWBOWL design gives the new Caterpillar No. 428 Scraper a faster loading rate because incoming material meets less material resistance and less friction from the load already in the bowl. While other scrapers are still in the cut struggling for the last few yards of their load, the new Cat units are on their way to the fill—with big pay loads!

NEW FEATURES: Outstanding new features of the No. 428 include: increased ground clearance—for high-speed travel in rough going; increased apron lift—for faster ejection of any material; large area pushblock—for better pusher contact.

NEW TIRES FOR THE DW15-No. 428

Both the CAT* DW15 (Series E) Tractor and No. 428 Scraper feature 26.5-25 wide-section tubeless tires—the product of extensive co-operative research by Caterpillar Tractor Co. and leading tire manufacturers. Tubeless tires offer load-carrying capacity comparable to conventional tires at a *reduced inflation pressure.* This gives better flotation and traction while decreasing rolling resistance. The wider tire treads take a "grouser like" bite, making more efficient use of engine horsepower. And tubeless tires eliminate 80% of the down time caused by tire failure.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

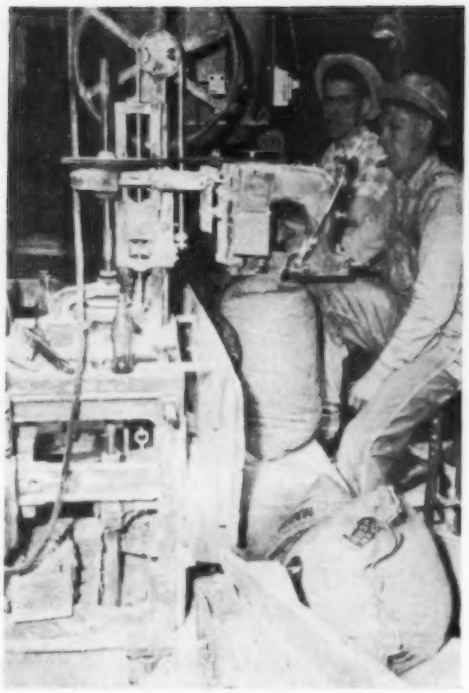
CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.

Left: The automatic scale bagger packs special products into multi-wall paper or burlap bags.

Right: The sewing machine sews the burlap bags (shown) and also multi-wall paper bags.



Marble Products

(*From page* 102)

drilled and pulled out with one wedge cut shot. Drilling is done with 4-in. Gardner-Denver drifter drills mounted on trucks—two on one and one on the other. Trojan 50 percent dynamite is used in 1½- by 8-in. sticks. Electric delay blasting caps are used in five delay periods. Air for all the mines is provided by a Worthington V-type compressor.

Loading is done with two ¾-cu. yd. diesel shovels, a Koehring 304 and a 305. The dipper sticks were shortened 2 ft. for the 22- to 27-ft. high rooms. Two Koehring Dumptors haul 6-ton loads to the plant.

Rock from any of the mines is discharged at the plant onto a 3- by 10-ft. McLanahan & Stone apron feeder. This feeds at any desired rate into the 24- by 36-in. Gruendler roller-bearing jaw primary crusher. The minus 3-in. rock is carried on a 24-in. by 130-ft. belt conveyor to a 4- by 10-ft. Seco 3-deck screen. At present only two decks of this screen are used—one with ⅜-in. and another with ¾-in. cloth to protect it.

The material over this screen—⅜ in. to 3 in.—usually goes to a Traylor TY 24 gyratory crusher. The minus ¾-in. product is carried on a 24-in. by 150-ft. belt conveyor to the top of the production building. The oversize from the screen can also go to a 3040 American hammermill for reduction to ⅜-in minus, and this goes on the same conveyor. Usually either crusher is used as desired, but both can be used simultaneously when a high percentage of fines is required.

The conveyor feeds on a 4- by 10-ft. Seco screen (No. 1) which is usually equipped with ½-in., ⅜-in. and No. 8 mesh cloth on its three decks, respectively. By changing these decks any range of sizes can be made, from ½ in. down. Any oversize from this screen is returned on an 18-in. by 150-ft. belt conveyor to one of four 50-ton bins. From this bin this rock can be returned through either crusher. The ⅜- to ½-in. rock off the second deck goes to another bin from which it can be returned for recrushing to ⅜-in. minus.

The minus ⅛-in. material through the bottom deck of this screen goes to a dust bin. The ⅛- to ⅜-in. material over the bottom deck goes to a third 4- by 10-ft., 3-deck Seco screen (No. 3). This usually has ¼-in., ⅛-in., and 10-mesh cloth. The ⅜- to ¼-in. material over the top deck goes to a storage bin from which it is fed by a conveyor over a small eccentric screen with vacuum attachment to remove the dust to a Richardson automatic scale bagger. This product is sold as roofing chips or terrazzo in 100-lb. Bemis multiwall paper or Wertheimer or Fulton burlap bags. A Union Special machine sews the paper bags; burlap bags are wire tied or sewed.

The ⅛- to ¼-in. material over the second deck of the No. 3 screen and the 10-mesh to ⅛-in. material over the bottom deck go to individual bins and are fed on the same conveyor to the same bagger. The material through the bottom deck (minus 10-mesh) goes to a dust bin. Each of seven bins has a capacity of 50 tons. The level of material in the packer feed bin is controlled by upper and lower level Bindicators. The packer has a loading capacity of up to 15 bags per minute. Bags are loaded direct to cars by a series of portable conveyors. Bulk materials can also be loaded direct to cars.

There is also a 28-ft. dia. by 40-ft. high steel silo which can be fed by belt conveyor with any product of the No. 2 or No. 3 screens. This can be used for storing and keeping dry 10 to 15 cars of one size of stone while others are being produced. Recovery is by a tunnel belt conveyor direct to box cars or open-top cars. At present this silo is being used for agstone.

There is a 40- by 175-ft. warehouse for the storage of bagged products which include colored chips from all parts of this country and Italy. The bagged materials are handled by a Mighty Midget Mobilift truck. A new 30- by 40-ft. repair shop was recently completed.

The company was formed by Eugene McNeel, who passed on before

(*Continued on page* 137)

Mineral Output of New England And Eastern States in 1955-56

Maine The value of mineral production in Maine in 1955 rose to $13,000,000, a 22 percent increase over the 1954 value, according to the Bureau of Mines, United States Department of the Interior. Sizeable increases in total value of sand and gravel (13 percent) and stone (8 percent) were partly responsible for higher total valuation, but the 27 percent jump in value of cement produced was the chief factor. Value of output increased for most of the commodities produced, including clay, feldspar, lime, peat, sheet mica, and slate.

Cement, sand and gravel, and stone in 1955 were the principal commodities produced and their combined output comprised 91 percent of the value of Maine's mineral industries.

Cement — Cement was Maine's chief mineral product in 1955, and represented more than half of the value of Maine's mineral production. Output comprised largely general-use and moderate-heat cements, although sizeable quantities of high-early-strength were burned. Masonry cement, the total for which was included in the total cement figures in 1954 and earlier years, was reported separately in 1955, amounting to 83,839, 376-pound barrels valued at $304,996.

Feldspar — The output of crude feldspar rose substantially in 1955 compared with 1954 and totaled 26,282 long tons valued at $188,961. The average value per ton, however, declined 2 percent to $7.19.

Sand and gravel—Total value of production of sand and gravel in Maine in 1955 rose 13 percent compared with 1954. Tonnage, however, increased only slightly, about 1 percent. Output of commercial sand and gravel rose 15 percent, and value of output was 30 percent greater than in 1954. Government-and-contractor production remained almost the same as in 1954, although it comprised the bulk of the sand and gravel mined, or 84 percent of the total. Over 95 percent was used for building and paving purposes.

Stone—Stone quarrying continued to be the third largest mineral industry in Maine in 1955. Tonnagewise, output increased 16 percent, and, measured by value, 8 percent, compared with 1954. Dimension and crushed granite, crushed limestone, and crushed sandstone were the chief types of stone produced. There were 13 commercial quarries active in 1955—3 in sandstone, 3 in limestone, and 8 in granite. Seven of the granite quarries produced dimension stone, of which one also produced crushed or broken stone, and one had crushed or broken granite only. The crushed or broken sandstone and granite were used largely for riprap, concrete aggregate, and roadstone. The crushed or broken limestone was utilized for agricultural purposes, the manufacture of lime and cement, and a small amount of riprap.

Massachusetts The value of mineral production in Massachusetts totaled $22,109,000 in 1955, a new record value, 17 percent higher than in 1954, the previous peak year. All the chief minerals produced shared in this rise in value, although most of the increase was due to a 26 percent jump in value of stone production.

Stone, sand and gravel and open market lime, in order, were the principal minerals produced in Massachusetts in 1955 and comprised over 99 percent of the total value of the mineral output of the state.

Lime—Output of lime, including both quick and hydrated material, rose 6 percent in tonnage and 15 percent in value in 1955 compared with 1954. The average value per ton increased 8 percent to $14.50, although still somewhat less than in 1953 and 1952. The average value for building and chemical and industrial lime increased in 1955 by $1.02 for building limes and $1.33 for chemical and industrial lime. Average value for agricultural lime in-

Mineral Production in Maine, 1954-55[1]

Mineral	1954 Short tons (unless otherwise stated)	1954 Value	1955 Short tons (unless otherwise stated)	1955 Value
Beryllium concentrate	.....[2]	.....[3]	22	$ 12,671
Cement:				
Masonry, 376-lb. bbls.	.....[4]	.....[4]	83,839	304,996
Portland, 376-lb. bbls.	1,973,249	$ 5,425,184	2,264,678	6,570,449
Clay	26,872	26,872	32,598	32,598
Feldspar (crude), long tons	.....[2]	.....[3]	26,282	188,961
Gem stones, carats	.....	.....	.....[5]	5,000
Peat	2,350	99,831	.....[2]	.....[3]
Mica:				
Scrap	.....[2]	.....[3]	71	1,922
Sheet, lbs.	.....[2]	.....[3]	21,121	128,721
Sand and gravel	7,460,620	2,538,143	7,528,903	2,855,585
Stone	1,023,709	2,355,385	1,192,361	2,542,228
Undistributed: Beryllium concentrate (1954), columbium-tantalum concentrate, lime, lithium mineral (spodumene) (1955), mica, scrap (1954) and sheet (1954), peat, slate, and minerals whose value must be concealed for particular years (indicated in appropriate column by footnote reference[3])		742,140		865,780
Total Maine[6]		$10,656,000		$13,000,000

[1]Production as measured by mine shipments, sales or marketable production (including consumption by producers).
[2]Bureau of Mines not at liberty to publish.
[3]Value included under "Undistributed."
[4]Included with portland cement.
[5]Quantity not available.
[6]Total has been adjusted to eliminate duplication in value of stone used in cement and lime.

creased only slightly compared with 1954.

Little change occurred in the percentages of the various uses of lime to total tonnage, chemical and industrial, 69 percent of the total in 1955 (67 percent in 1954); building lime, 22 percent in 1955 (23 percent in 1954); and agricultural uses, 9 percent in 1955 (10 percent in 1954).

Sand and gravel—The output of sand and gravel in 1955 decreased slightly, about 1 percent, although the value of production rose 6 percent compared with 1954. Due largely to increased coverage of sand and gravel plants in 1955, production was reported from 147 commercial pits compared with 119 in 1954. Building and paving sand and gravel represented the greater part of the total produced, structural sand and gravel totaling 57 percent of all sand and gravel, and paving sand and gravel amounting to 35 percent of the total. Other types of sand and gravel produced in Massachusetts in 1955 were molding, engine, filter, and miscellaneous sands and railroad ballast gravel. The average value of all sand and gravel in 1955 increased to $0.93, or 7 percent higher than in 1954, although the average value of commercial output decreased slightly.

Stone — Tonnage of stone produced in Massachusetts in 1955 totaled 4,128,005 short tons valued at $11,381,164, an increase of 40 percent in quantity and 26 percent in value compared with 1954. Both dimension and crushed or broken stone were quarried.

Output of crushed and broken stone, largely for use as concrete aggregate and roadstone, rose sharply in 1955 to over 4 million tons valued at nearly 6½ million dollars, and was 42 percent higher in tonnage and 30 percent larger in value than in 1954. Other outlets for which sizeable amounts of crushed and broken stone were used were riprap, railroad ballast, agricultural (limestone), furnace flux, and lime manufacture. Of this crushed and broken stone sold, basalt had the largest tonnage, followed by granite. Other kinds of stone quarried in Massachusetts and marketed in crushed or broken form were limestone and miscellaneous stone (granitic gneiss).

Mineral Production in Massachusetts, 1954-55[1]

Mineral	1954 Short tons (unless otherwise stated)	1954 Value	1955 Short tons (unless otherwise stated)	1955 Value
Clay	128,998	$ 121,049	124,832	$ 141,654
Lime (open market)	127,836	1,709,341	134,952	1,957,346
Sand and gravel	9,640,274	8,366,409	9,576,235	8,907,639
Stone	2,942,435	9,039,590	4,128,005	11,381,164
Undistributed: Peat, ground sand (1955) and recovered elemental sulphur (1954)	.....	12,077	.....	24,623
Total Massachusetts[2]	.....	$18,851,000	.....	$22,109,000

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Total has been adjusted to eliminate duplication in value of stone used for lime.

Vermont The value of mineral production in Vermont in 1955 again established a new record, rising to $23,884,000, or 17 percent greater than the former peak year 1954. Nonmetallic minerals supplied 86 percent of the total value, the balance consisting of the value of the output of copper, gold, and silver. Twelve minerals were produced, compared with 11 in other recent years.

The principal industry in Vermont in 1955, measured by value of output, was the quarrying of marble, granite, and limestone. Slate, asbestos, copper, and sand and gravel were the next most important minerals.

Asbestos — The chief supplier of asbestos in the United States in 1955 was the State of Vermont. The Ruberoid Co. operated its Vermont Asbestos Mines Division quarry and mill in Lowell, about 14 miles north of Hyde Park, Lamoille County. Shipments of the chrysotile mined by the firm remained at a high level in 1955, although slightly less than in 1954. The company marketed 17 grades of asbestos, varying in selling price between $35 and $504 per ton. Prices in 1955 showed little change.

Sand and gravel — Production of sand and gravel in 1955 rose 19 percent in quantity and 5 percent in value compared with 1954. Of the total tonnage, over 85 percent was utilized in the expanded highway construction program. Output was reported from 29 commercial and 4 government-and-contractor operators producing in all 14 counties.

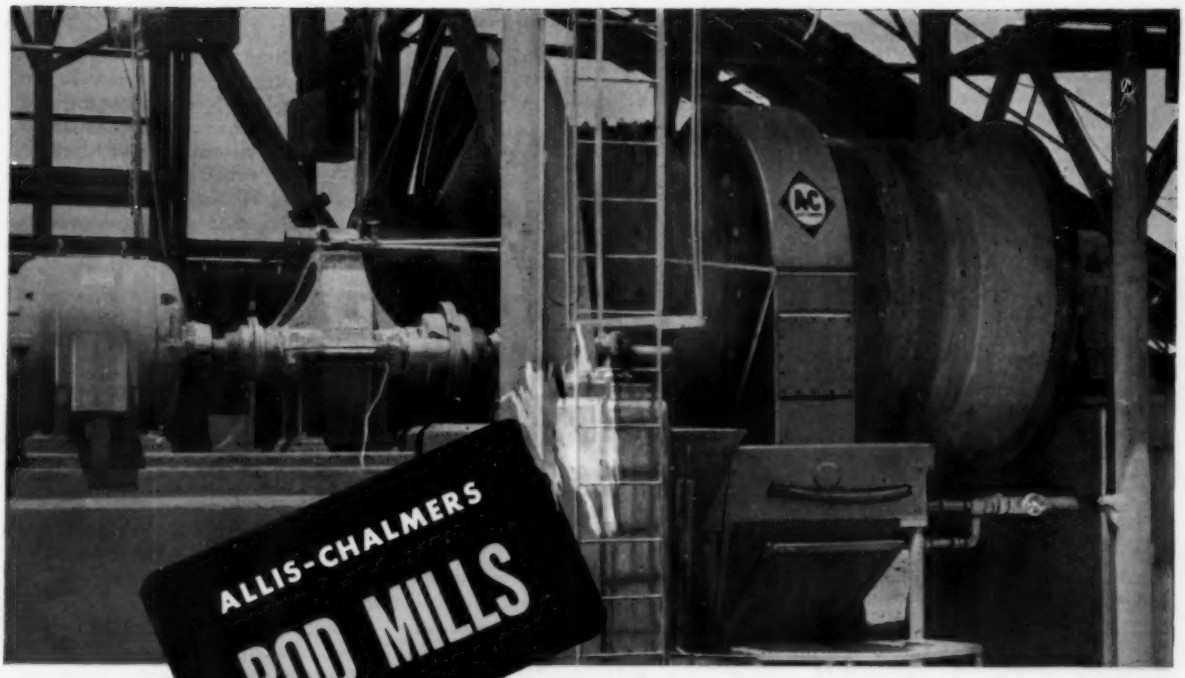
Stone — The stone industry continued to be the largest industry in the State of Vermont in 1955, totaling 46 percent of the total value of mineral production. Output in 1955 rose 33 percent in tonnage and 35 percent in value, compared with 1954.

Mineral Production in Vermont, 1954-55[1]

Mineral	1954 Short tons (unless otherwise stated)	1954 Value	1955 Short tons (unless otherwise stated)	1955 Value
Copper (recoverable content of ores, etc.)	4,352	$ 2,567,680	4,305	$ 3,211,530
Gem stones, lbs.	.....	.....	30	8
Gold (recoverable content of ores, etc.), troy ounces	185	6,475	181	6,335
Pyrites, long tons	20,713	.....[2]	21,852	.....[2]
Sand and gravel	1,481,549	1,110,996	1,763,229	1,169,031
Silver (recoverable content of ores, etc.), troy ounces	48,572	43,960	50,447	45,657
Stone	436,870	8,178,389	581,749	11,061,196
Talc	66,195	198,585	.....[2]	.....[2]
Undistributed: Asbestos, clay, lime, slate, and minerals whose values must be concealed for particular years indicated in appropriate column by footnote reference[2]		8,400,829		8,414,528
Total Vermont[3]		$20,483,000		$23,884,000

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Value included with "Undistributed."
[3]The total has been adjusted to eliminate duplication in the value of stone.

West Virginia Value of mineral production in West Virginia in 1955 increased 19 percent as compared with 1954, according to the Bureau of Mines, United States Department of the Interior. Commodities showing increases in value of production included lime (55 percent), sand and gravel (17 percent), and calcium chloride (65 percent). The output



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A-5311

Mineral Production in West Virginia, 1954-55[1]

Mineral	1954 Short tons (unless otherwise stated)	1954 Value	1955 Short tons (unless otherwise stated)	1955 Value
Clay	587,120	$ 1,450,539	707,433	$ 2,563,289
Coal	115,996,041	541,369,652	139,167,889	653,388,287
Natural gas, million cu. ft.	191,601	45,601,000	212,403	49,915,000
Natural gas liquids:				
Natural gasoline, thousand gallons	41,076	2,593,000	35,756	2,352,000
LP-Gas, thousand gal.	142,884	5,035,000	286,871	6,376,000
Petroleum (crude), thousand 42-gal. bbls.	2,902	8,500,000	2,320[2]	7,080,000[2]
Salt (common)	471,516	2,885,696	638,390	3,476,352
Sand and gravel	4,073,991	8,351,153	5,171,399	9,779,288
Stone	7,314,934	11,743,440	5,898,585	9,714,168
Undistributed: Abrasive stones (1955), bromine, calcium magnesium chloride, cement, lime, calcareous marl, and recovered sulphur		10,504,113		12,929,982
Total West Virginia		$636,311,000[3]		$755,512,130[3]

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Preliminary figure, subject to revision.
[3]Total has been adjusted to avoid duplication in the value of clay and stone used in the manufacture of cement and lime.

of salt and cement also increased in 1955. Stone decreased 17 percent in value of production.

Lime — Production and value of production of lime in 1955 increased 48 and 55 percent respectively, as compared with 1954. Output was used primarily in the chemical and industrial industries and as a refractory material. Other uses were in the building and agricultural industries.

Salt — Production of salt in the form of well brines was reported by 4 companies operating in 3 counties in 1955. Production increased 35 percent as compared with 1954. A portion of the brine output was converted into evaporated salt by the open pan and vacuum pan methods, but the major portion was consumed as brine in the manufacture of chemicals.

Sand and gravel—There were 32 sand and gravel operations reporting production in West Virginia in 1955. Over half of these plants were dredges operating on state rivers. The greater portion of state output was utilized for building and paving purposes. There was also considerable output of glass sand during the year. Other uses for the product included engine sand, molding sand, and railroad ballast gravel.

Stone—Crushed limestone was by far the leading type of stone produced in West Virginia in 1955. Major uses of the product were as blast and open hearth furnace flux (48 percent), as concrete aggregate and roadstone (23 percent), railroad ballast (2 percent), and for agricultural purposes (1 percent), and all other uses (including limestone used in manufacture of cement and lime) (26 percent). A small amount of sandstone was also produced.

Virginia The value of mineral production in Virginia in 1956 increased to $201,781,000, a rise of 17 percent compared with 1955. Among the mineral commodities showing large gains in value in 1956 over 1955 levels were sand and gravel, the value rising to $10,339,000, or 28 percent higher than in 1955. The value of kyanite output also increased substantially. Moderate gains of from 1 to 7 percent were made in the value of lead and titanium concentrate production among the metallic minerals and in the value of output of gypsum, pyrites, salt, and stone among nonmetallic minerals.

By far the most important stone in both quantity and value was crushed limestone, followed by crushed granite, basalt, and sandstone. Other kinds of stone produced were dimension sandstone, crushed marble, and crushed and dimension miscellaneous stone. The values of feldspar, iron oxide pigments and calcareous marl were estimated to be higher in 1956 than in 1955, while those of aplite and talc and ground soapstone declined.

North Carolina The value of mineral production in North Carolina in 1956 was $44,366,000 compared with $41,210,000 in 1955, an increase of 8 percent over the previous year.

Production of stone, the leading

Mineral Production in Virginia, 1955-56[1]

Mineral	1955 Short tons (unless otherwise stated)	1955 Value	Preliminary 1956 Short tons (unless otherwise stated)	Preliminary 1956 Value
Beryllium concentrate, lbs.	1,259	$ 389	.....[2]	.....[2]
Clay	935,941	873,348	1,207,000	$ 1,126,000
Coal	23,507,509[3]	108,173,907[3]	27,855,000	.....[2]
Gem stones, lbs.	255	344	.....[2]	.....[2]
Lime (open market)	494,293	5,048,697	340,000	3,475,000
Manganese ore (35 percent or more Mn) gross weight	32,654	2,779,337	21,000	1,787,000
Natural gas, million cu. ft.	968	259,000	1,000	.....[2]
Petroleum (crude), thousand 42-gal. bbls.	12	.....[2]	9	.....[2]
Sand and gravel	6,460,886	8,076,104	8,010,000	10,339,000
Slate	31,536	820,124	.....[2]	.....[2]
Stone	11,965,890	19,869,675	12,262,941	20,148,000
Undistributed: Aplite, beryllium concentrate (1956), cement, feldspar, gem stones (1956), gypsum, iron oxide pigments, kyanite, lead, calcareous marl, mica, pyrites, salt, silver, slate (1956), talc and ground soapstone, titanium concentrate, zinc, and minerals whose value must be concealed for particular years, indicated in appropriate column by footnote[2]		29,480,849		167,592,000
Total Virginia[4]		$172,590,000		$201,781,000

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Included under "Undistributed."
[3]Preliminary—subject to revision.
[4]Total has been adjusted to eliminate duplication in the value of clay and stone used in cement and lime.

Mineral Production in North Carolina 1955-56[1]

Mineral	1955 Short tons (unless otherwise stated)	1955 Value	1956[2] Short tons (unless otherwise stated)	1956[2] Value
Abrasive stones	227	$ 12,104	250	$ 12,000
Beryllium concentrates, lb.	.....[3]	.....[3]	7,100	2,000
Clays	2,375,494	1,792,081	2,551,000	1,874,000
Copper, lb	300	112	.....[3]	.....[3]
Feldspar, crude, long tons	242,724	2,184,793	249,000	2,360,000
Gem stones, grams	10	10	.....[4]	500
Gold, troy ounces	190	6,650	.....[3]	.....[3]
Lead	2	626	.....[3]	.....[3]
Mica, scrap and flake	60,887	1,377,035	52,000	1,300,000
Mica, sheet, lb.	553,444	2,745,234	.....[3]	.....[3]
Sand and gravel	7,785,741	5,911,223	7,588,000	5,744,000
Silver, troy ounces	181	164	.....[3]	.....[3]
Stone	10,903,366	16,532,910	13,190,000	19,598,000
Talc and pyrophyllite (crude)	125,206	571,689	121,000	557,000
Tungsten concentrates (60% WO_3 basis)	2,609	.....[3]	2,836	.....[3]
Undistributed: Asbestos, olivine, vermiculite, and minerals whose value must be concealed for particular years as indicated by footnote[3]		10,074,950		12,918,000
Total North Carolina		$41,210,000		$44,366,000

[1]Production as measured by mine or plant shipments or marketable production (including consumption by producers).
[2]Estimated from reports of producers and other sources.
[3]Included with "Undistributed."
[4]Weight not recorded.

mineral commodity, was estimated to be 13,190,000 tons valued at $19,598,000, an increase of approximately 20 percent above 1955. Tungsten, the second most important mineral, increased 9 percent in tonnage but only 1 percent in value, the lesser increase in value being due to smaller shipments to General Service Administration stockpiles in the second half of the year and at lower prices. The value of clays increased 5 percent and crude feldspar 8 percent above 1955.

The gains registered by these four minerals were partially offset by losses in scrap mica (15 percent in quantity and 6 percent in value), sand and gravel (3 percent), olivine (5 percent) and crude talc (3 percent).

Maryland The value of mineral production in Maryland in 1955 increased 15 percent as compared with 1954. Accounting in part for the increase in total state value was the fact that 1955 marked the first year in the collection of data on oyster shell production, and new collection procedures initiated in the cement canvass brought wider coverage than formerly. Although output of lime increased 11 percent, value of output decreased 2 percent due to a drop in unit price of lime from $10.22 to $8.98 per ton.

Cement—The production of portland cement in Maryland in 1955 was characterized by an increase in average price per barrel from $2.46 to $2.85. New collection procedures initiated during 1955, when data on masonry cement were collected for the first time, made comparisons between 1954 and 1955 production and value invalid.

Lime — Although the production of lime in Maryland in 1955 increased 11 percent as compared with the preceding year, the value of production decreased 2 percent. This can be explained by the fact that agricultural lime, which constitutes 91 percent of total lime production in Maryland, dropped in value from $10.15 per ton to $8.83 per ton. Frederick County was the center of lime production again in 1955. Production consisted of quicklime (76 percent) and hydrated lime (24 percent).

Sand and gravel—The production of sand and gravel continued again in 1955 to be the major industry in Maryland in terms of both tonnage and value. Total state production dropped 4 percent as compared with 1954. This drop, however, was caused by a 57 percent decrease in production by government and contractor crews. Because of the low unit value assigned to government and contractor production, this large drop did not cause a corresponding decrease in total value of sand and gravel production for the state. In fact, there was a slight increase in total value of sand and gravel production as commercial production increased 1 percent over 1954.

Production consisted of paving sand (29 percent), structural sand (23 percent), paving gravel (27 percent), and structural gravel (20 percent). Other uses of sand included glass making, grinding and polishing, and for filter, fire and furnace, and engine sand purposes.

Stone—The production of stone in Maryland in 1955 increased 5 percent as compared with 1954. Although limestone was by far the leading type of stone quarried, basalt, granite, marble, sandstone, and miscellaneous stone were also produced. Crushed and broken stone, mostly limestone, made up 99 percent of the total stone output. Dimension stone, produced primarily for use in rough construction work, was also quarried in Maryland in 1954.

New York The value of mineral production in New

Mineral Production in Maryland, 1954-55[1]

Mineral	1954 Short tons (unless otherwise stated)	1954 Value	1955 Short tons (unless otherwise stated)	1955 Value
Clay	627,311	$ 1,165,747	698,257	$ 1,264,948
Coal	421,616	1,879,018	512,469[2]	2,001,743[2]
Lime	67,081	685,427	74,497	669,228
Natural gas, million cu. ft.	1,394	282,000	3,116	626,000
Sand and gravel	10,097,800	12,171,613	9,694,928	12,210,658
Stone	5,064,526	8,265,521	5,426,076	9,980,391
Undistributed: Portland cement, masonry cement (1955), greensand marl, mica (1954), beryl (1954), potassium salts, slate, talc and soapstone		7,288,888		9,847,806
Total Maryland		$30,743,000[3]		$35,490,700[3]

[1]Production as measured by mine shipments or marketable production (including consumption by producers) except that fuels are strictly production.
[2]Preliminary figure, subject to revision.
[3]The total has been adjusted to eliminate duplication in the value of clay and stone used in production of cement.

Mineral Production in New York, 1955-56[1]

Mineral	1955 Short tons (unless otherwise stated)	1955 Value	Preliminary 1956 Short tons (unless otherwise stated)	Preliminary 1956 Value
Cement (376-lb. bbls.)	17,522,714	$ 50,755,814	17,091,000	$ 49,505,000
Clays	1,393,665	1,676,215	1,268,000	2,196,000
Emery	10,735	151,455	13,000	180,000
Gem stones	.....	194	.....[2]	.....[2]
Gypsum (crude)	1,249,119	4,403,895	1,274,000	4,485,000
Iron ore (usable) long tons, gross weight	3,201,927	38,018,783	3,800,000	45,500,000
Lead (recoverable content of ores, etc.)	1,037	309,441	1,600	528,000
Lime	82,890	1,365,481	.....[2]	.....[2]
Natural gas (million cu. ft.)	3,637	1,073,000	3,900	1,100,000
Petroleum (crude), thousand 42-gal. bbls.	2,904	10,310,000	2,775	12,490,000
Pyrites, long tons	10,417	45,706	.....[2]	.....[2]
Salt (common)	3,779,547	25,214,191	.....[2]	.....[2]
Sand and gravel	25,561,941	25,542,363	24,539,000	25,287,000
Silver (recoverable content of ores, etc.), troy ounces	66,162	59,880	74,000	67,000
Slate	90,668	1,344,715	98,000	1,708,000
Stone	22,812,222	37,919,063	23,727,000	38,343,000
Zinc (recoverable content of ores, etc.)	53,016	13,041,936	59,000	15,819,000
Undistributed: Abrasive garnet, crude iron oxide for pigments, natural cement, talc, titanium concentrates, wollastonite, peat, and minerals whose value must be concealed for particular years (indicated in appropriate column by footnote reference[2])		10,167,040		39,375,421
Total New York[3]		$216,953,230		$232,137,000

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers.)
[2]Included with "Undistributed."
[3]Total has been adjusted to eliminate duplication in the value of clays and stone.

York in 1956 totaled $232,137,000, an increase of 7 percent. Major commodities produced in the state, in order of decreasing value, were cement, iron ore, stone, and salt. Other important mineral industries of the state were sand and gravel, zinc, and petroleum. These seven minerals accounted for 92 percent of the total dollar value of the mineral production.

In New York the dominant minerals were again the nonmetallics, representing 65 percent of the total value of the production of the state. Cement was the leading mineral in the state in terms of value. Stone was the second ranking nonmetallic mineral in value of output with an estimated total of $38,343,000. Sand and gravel production remained virtually the same as the previous year.

New Jersey According to estimates of the Bureau of Mines, United States Department of the Interior, the value of mineral production of New Jersey in 1956 totaled $66,263,000, a rise of some 15 percent over 1955. This advance was due to increases in both production and value of all minerals except manganiferous zinc ores and the manganiferous residuum recovered therefrom.

Nonmetallic minerals held the lead in value of 1956 mineral production of New Jersey accounting for nearly twice the dollar value of the metallic minerals.

Substantial gains are noted in the production of sand and gravel and stone. This increment in building materials very likely reflects the high rate of activity in the building and construction industries.

Pennsylvania Mineral production in Pennsylvania in 1956 was valued at $1,068,795,000, an increase of 10 percent over 1955. Bituminous coal continued to rank first in value of mineral production, followed by anthracite, cement, stone, natural gas, and petroleum. Of the total value of output, fuels accounted for 75 percent; nonmetallic minerals, 24 percent; and metals, 1 percent.

Fourteen nonmetallic minerals were produced in Pennsylvania in 1956. Lime, oyster shells, slate, stone, and pyrites in 1956 declined in both tonnage and value, whereas cement and sand and gravel dropped only in total value. Six of the remaining nonmetallic minerals, clays, iron oxide pigments, mica, sericite schist, sulphur, and tripoli, showed increases over both 1955 tonnage and value. Cement ranged first in value of output of nonmetallic minerals, with 58 percent of the total. The next high ranking commodities were stone, sand and gravel, lime, and clays.

Mineral Production in New Jersey, 1955-56[1]

Mineral	1955 Short tons (unless otherwise stated)	1955 Value	Preliminary 1956 Short tons (unless otherwise stated)	Preliminary 1956 Value
Clays	644,192	$ 1,561,994	665,000	$ 1,660,000
Iron ore (usable), long tons, gross weight	759,550	13,633,370	920,000	16,500,000
Manganiferous residuum, gross weight	213,370	.....[2]	.....[2]	.....[2]
Marl (Greensand)	5,069	205,606	6,000	275,000
Oyster shells	725	12,430	1,500	28,000
Sand and gravel	11,152,552	16,424,417	13,100,000	20,500,000
Stone	8,361,804	17,665,825	9,085,000	20,650,000
Sulphur, recovered elemental, long tons	7,551	243,984	10,400	290,000
Zinc (recoverable content of ore, etc.)[3]	11,643	2,863,945	4,400	1,188,000
Undistributed: Lime, magnesium compounds, peat, and minerals whose value must be concealed for particular years (indicated in appropriate column by footnote reference[2]). Excludes limestone used in the manufacturing of lime (1955)		4,929,516		5,172,000
Total New Jersey		$57,495,000		$66,263,000

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Included with "Undistributed."
[3]Recoverable zinc valued at the yearly average price of Prime Western Slab Zinc, E. St. Louis market. Represents value established after transportation, smelting, and manufacturing charges have been added to the value of ore at mine.

Mineral Production in Pennsylvania, 1955-56[1]

Mineral	1955 Short tons (unless otherwise stated)	1955 Value	Preliminary 1956 Short tons (unless otherwise stated)	Preliminary 1956 Value
Cement, 376-lb. bbl.	48,089,578	$141,969,042	50,200,000	$ 148,200,000
Clays	4,019,909	12,413,093	4,260,000	14,770,000
Coal:				
Anthracite	26,204,554	206,096,662	28,600,000	...[2]
Bituminous	85,713,456[3]	440,451,700[3]	89,805,000	...[2]
Cobalt (content of ore), lb.	478,840	...[3]	590,000	...[3]
Gem stones, lb.	100	60	...[2]	...[2]
Gold (recoverable content of ores, etc.), troy ounces	1,610	56,350	1,650	...[2]
Iron oxide pigments (crude)	519	6,714	600	7,200
Lime	1,424,051	17,631,795	1,410,000	17,469,910
Natural gas, million cu. ft.	99,172	29,652,000	109,500	32,800,000
Natural gas liquids:				
Natural gasoline, LP-gases, thousand gal.	5,300	371,000	5,000	355,000
Peat	23,277	219,628	25,900	245,000
Petroleum (crude), thousand 42-gal. bbl.	8,423	29,820,000	8,164	32,660,000
Sand and gravel	13,312,971	20,511,847	13,450,000	19,900,000
Silver (recoverable content of ores, etc.), troy ounces.	10,379	9,394	11,000	...[3]
Slate	186,035	4,421,298	135,000	3,550,000
Stone	44,437,623	70,056,080	41,152,000	67,523,000
Sulphur (recoverable elemental), long tons	7,738	263,370	13,600	414,000
Tripoli	990	21,780	1,000	25,000
Undistributed: Copper, iron ore, mica, pyrites, sand and sandstone (ground), sericite schist, and minerals whose value must be concealed for particular years (indicated in appropriate column by footnote reference[2])		15,819,073		749,088,300
Total Pennsylvania		$970,684,000[4]		$1,068,795,000[4]

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers), except that fuels are strictly production.
[2]Included with "Undistributed."
[3]Preliminary figure. Subject to revision.
[4]The total has been adjusted to eliminate duplication in the value of clays and stone in the manufacture of lime and cement.

Oolite Crushed Stone Co. Erects Rock Crushing Plant

Construction of a $1,000,000 rock-crushing plant was recently completed by the Oolite Crushed Stone Company, Miami, Fla. The plant, capable of turning out 3,000 tons of crushed limestone per day, will process Miami oolite rock into concrete rock, pea rock, sand, railroad ballast, and highway rock.

President of the new firm is Willard C. Webster. E. N. Belcher is chairman of the board.

Denver G.S.A. to Supervise S. D., Mont. Materials Depot

According to Franklin G. Flotete, General Services Administration, South Dakota, the Denver G.S.A. offices will supervise government defense materials depots at Custer, S. D., and Phillipsburg, Mont., which formerly were part of the Kansas City and Seattle region.

These depots accept delivery of mica, beryl, columbium-tantalum, etc., from small producers. The Denver office, headed by Otto G. Klein, will now also be used for inspecting defense materials purchased in South Dakota, Montana, and Nebraska. It will continue to handle government supplies and buildings in Colorado, Wyoming, Utah and New Mexico.

Heavy construction awards rose to $344,500,000 for the week ending April 11, lifting the cumulative total for the first 15 weeks of 1957 to $5,193,000,000, 21 percent below the corresponding period in 1956. The 1957 total in federal construction to date is 54 percent ahead of 1956.

The Columbia Quarry Company, Columbia, Mo., has purchased the J. L. Shiely gravel crushing plant located near Greene, N. D. The plant will be moved to Columbia this summer.

The Sand Products Corporation's one-story brick building on Whisky Island, Cleveland, Ohio, was damaged by fire on February 14. Sterling N. Farmer, vice-president, estimated the loss at $11,000.

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STEELKLAD BRICK—a RITEX basic brick with steel plates already attached. It may provide major savings in your operation.

HIGH ALUMINA BRICK—These come in a full line of shapes and sizes. ARCO-70 (70% Alumina) is most generally recommended, though brick ranging from 50% to 85% Alumina can also be furnished.

As part of our complete refractories service, we have developed cements, mortars, plastics and castables for the service conditions which have proved long-lasting and economical. They meet all the varying requirements of dry or wet application and cold or hot sets. Delivered in cans or bags of various weights.

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At North American Cement Corporation, Howe's Cave, N.Y., this giant Marion power shovel keeps working, with fewer overhauls, on Gulf Dieselect fuel and Gulflube Motor Oil H.D. Chain drives on the shovel are protected by Gulf Paragon. Gulfcrest oil is used to lubricate the air compressors.

North American Cement Corporation gets top equipment performance with Gulf Quality Fuels and Lubricants

To keep equipment operating smoothly and efficiently, North American Cement Corporation depends on Gulf quality fuels and lubricants.

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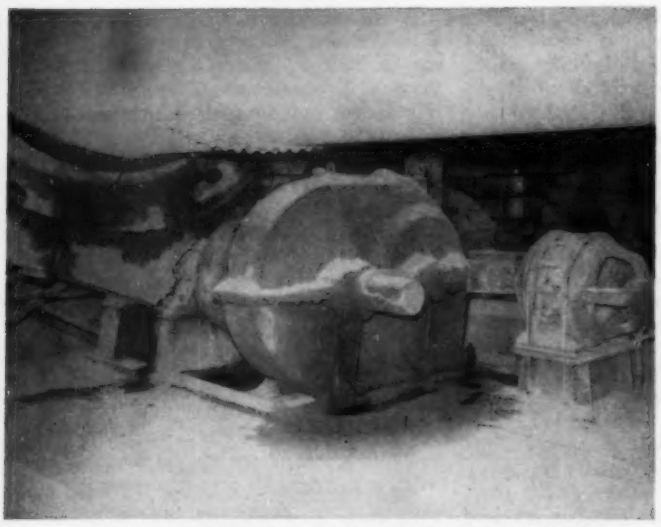
Gulf Dieselect burns clean to cut costly downtime. It reduces valve sticking, helps prevent harmful deposits in fuel systems and injectors. It burns evenly and completely, provides top engine performance.

Gulflube H.D. provides superior lubrication. It keeps rings clean and free . . . aids in getting better compression . . . lasts longer and cuts maintenance costs.

North American Cement Corporation also uses Gulf Lubcote on open spur gears, Gulf Paragon on chain drives, Gulflex A on pressure bearing fittings, Gulf E.P. 95 on eccentric drive shafts on their crushers.

Are you entirely satisfied with the performance of *your* equipment . . . and expense for maintenance? Call the Gulf Sales Engineer for practical help. He's at your nearest Gulf office.



Reduction gears for rotary kilns are protected with Gulf Harmony 97. Gulf quality fuels and lubricants mean fewer mechanical delays, lower maintenance costs.

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As seen from the top of the Bird & Son roofing granule plant, the raw material piles resemble a pair of dormant volcanoes. Fed to the stockpiles from a track hopper by the conveyor at left, the rock enters the plant on the reclaiming belt, bottom.

By BUREN C. HEROD

a model of efficiency and cleanliness—

BIRD & SON'S

new roofing granule plant

ANOTHER ON THE SPOT REPORT

ONE of the most interesting installations in the nonmetallic minerals field can be found at Stark Industrial Park near Charleston, S. C., where Bird & Son, Inc., has built and placed in operation a crushing, screening, and processing plant for the production of roofing granules. The Bird organization, originally founded in 1795, with general offices at East Walpole, Mass., has long been a producer of roofing materials.

A part of a construction project which was started in 1954 and completed in January, 1955, the granule plant is located adjacent to a roofing mill which it supplies and with which it was simultaneously constructed. Planned with obvious efficiency, the granule processing operation is completely housed in a modern steel-frame structure, and with the compact layout of crushing, screening, drying, and other operating phases, it represents a highly efficient manufacturing plant.

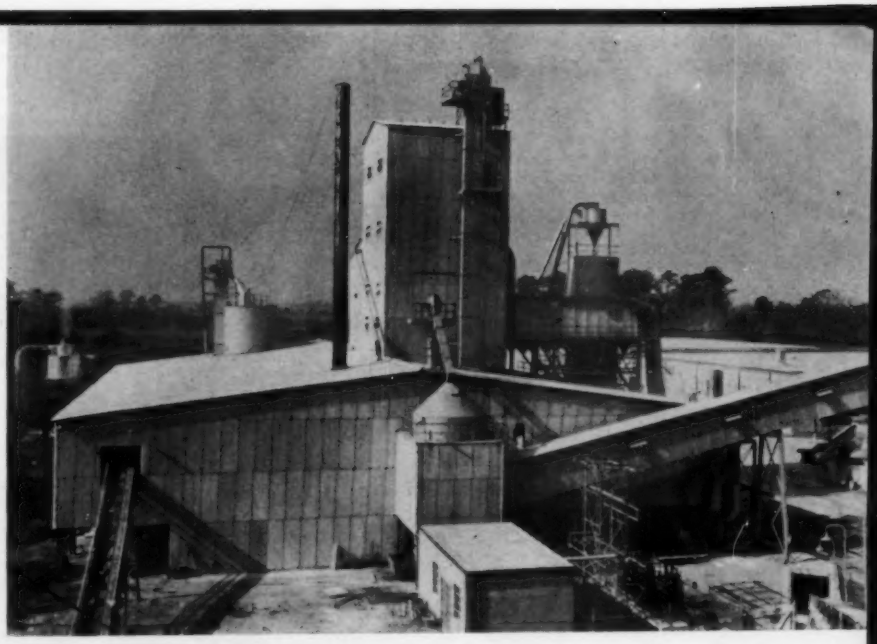
Designed by company engineers, who were assisted in the detailed planning of the crushing and drying phases by engineers of B. L. Montague, Charleston, S. C., the granule plant was also constructed by this firm. This plant and the companion roofing mill, representing a $2,500,000 investment, were erected at this site to accommodate the firm's Southeastern market, which could not be adequately served by the East Walpole, Mass., Chicago, Ill., or Shreveport, La., facilities.

The output of colored granules produced here is consumed in the Bird Roofing Mills. The Charleston roofing machine, reported to be the longest in the world, produces granule-coated Bird asphalt shingles and roll roofing.

Raw materials fed to the granule operation are delivered to the plant site in railroad gondolas, and the tonnage is substantial. These materials as received, are specified by Bird & Son, Inc., to be minus 2-in. size.

Incoming rail cars are spotted on a siding adjoining the granule plant, where a Hewitt-Robins car shakeout is installed. Material discharged into an upper-track hopper is transferred by a Barber-Greene reciprocating feeder to a 24-in. by 300-ft. belt conveyor, on which it is transported to a stockpiling installation.

The latter consists of a steel framework tower, about 50 ft. high, on which a 30-in. by 100-ft. reversible stockpiling conveyor is mounted. With approximately 80 t.p.h. capacities on these conveyors, unloading and stockpiling of rail shipments can be handled at the rate of about 9 cars per day on an 8-hour shift, or one 60-ton car in 45 minutes.



Every phase of the granule processing, from crushing to firing in a kiln, is completely housed in this building. At the lower right is the stockpile feed belt tunnel leading to the track hopper, where incoming raw materials are discharged. The finished granules are transferred in the conveyor gallery, right center, to the roofing mill.

Stockpiled material is reclaimed through gravity-fed chutes in a reclaiming tunnel. Constructed of 6-ft. Armco liners, the tunnel houses approximately half the length of a 24-in. by 400-ft. belt conveyor that supplies the granule plant.

Upon entering the plant, the feed is discharged from the reclaiming belt onto a 3- by 8-ft. Allis-Chalmers single-deck vibrating scalping screen. Oversize is chuted to an Allis-Chalmers 636 Hydracone primary crusher, while the throughs are fed to an 18-in. belt conveyor, where they are joined by the primary crusher product.

The materials are then transported to the dryer—an 80-in. by 40-ft. XH-12 Ruggles-Coles rotary unit which is fired with natural gas. Here the moisture in the raw feed, which may be as high as 5 percent, is reduced to less than ½ to 1 percent. Provision is made to by-pass the dryer, if desired, by means of a flop-gate which allows the feed to be directed *via* chutes and a 60-ft. bucket elevator, which also accommodates the dryer discharge, to the respective one of a pair of 250-ton steel storage tanks.

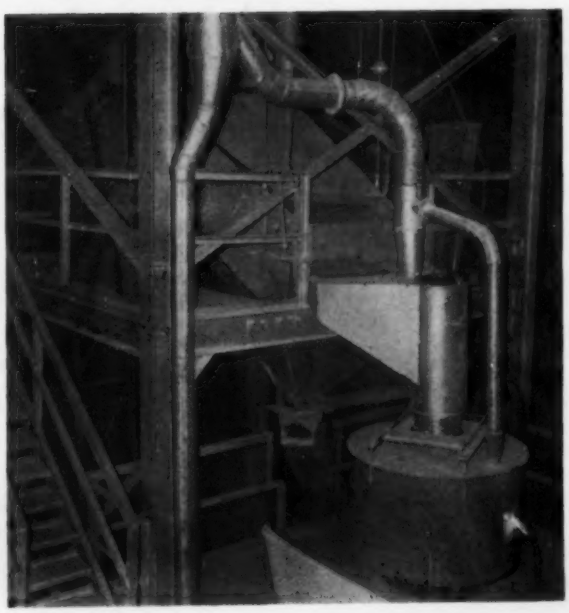
A Syntron feeder below each of the storage tanks transfers the raw materials to an 18-in. belt conveyor for transport to the next processing phase. The rate of feed is varied in accordance with the operating rate in subsequent phases.

In the next step the feed is discharged on a second scalper — a single-deck, 4- by 10-ft. Allis-Chalmers — from which the oversize is fed to a 236 Hydracone secondary crusher. The secondary crushing circuit is closed by a short 18-in. belt conveyor that returns the crusher product to the belt feeding the second scalper.

Throughs from the latter are chuted to an 18-in. by 20-ft. belt conveyor on which they are transferred to the boot of a 100-ft. Chain Belt Rex elevator. The crushed products are then raised to the grading phase of the operation.

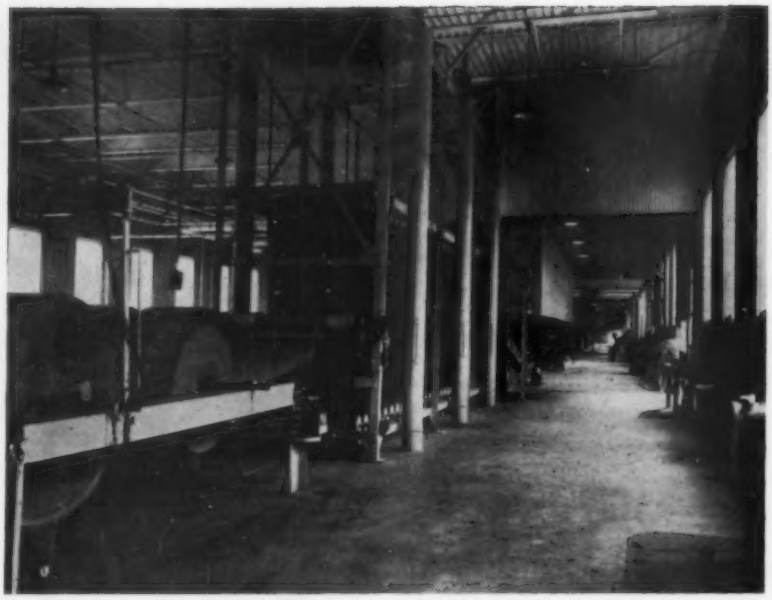
For the initial step, the unscreened granules are discharged to a 4- by 10-ft. Tyler Hum-mer double-deck screen. Those fractions retained and passing the lower deck are separately chuted into the respective pair of

Above: In this view of the granule plant a part of the crushing and screening section is seen. At the far right is the firing end of the dryer. Excellent housekeeping is maintained in the plant at all times.



Right: The secondary scalper and crusher preceding the granule-grading phase.

Reported to be the longest in the world, this roofing machine in the Charleston mill is supplied colored granules from the adjacent granule plant for production of coated shingles and roll roofing.



finished crushed product storage bins, of which there are six. Each bin has a capacity of 125 tons.

The fraction retained on the upper deck of the first grading unit is fed to a following pair of 4- by 10-ft. double-deck Tyler Hum-mer screens. Those sizes retained and passing the bottom deck of each of the latter screens are chuted to the respective one of the four remaining storage bins.

The fractions retained on the top decks are chuted to an Allis-Chalmers double-roll crusher, and the resultant product is fed to the same 20-ft. belt conveyor that connects the secondary scalper with the bucket elevator. This closes the final grading circuit.

Provision is made for diverting a part of the flow through the grading screens to a 48-in. by 6-ft. Hardinge conical ball mill which operates in closed circuit with a No. 54 air classifier. The product of this milling circuit is transferred to the roofiing mill for use as a stabilizer in asphalt coating.

From the above six storage bins, the granules are transported on belt conveyors to the next processing step, the coloring phase. Here they are mixed with a pigmented glaze under carefully controlled conditions prior to firing in a kiln.

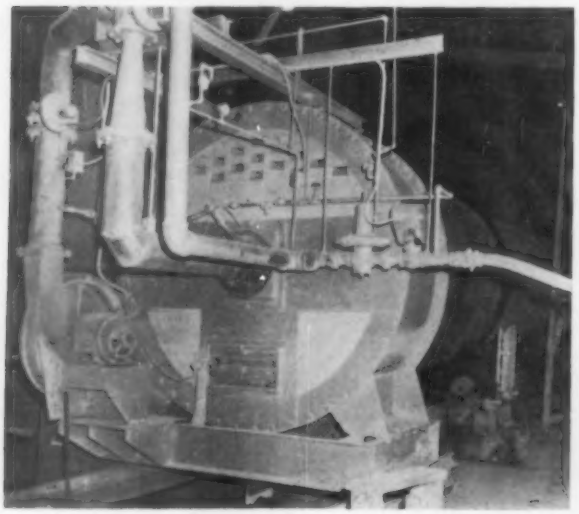
The freshly color-coated granules are then fed to a 6- by 50-ft. XL Ruggles-Cole continuous kiln in

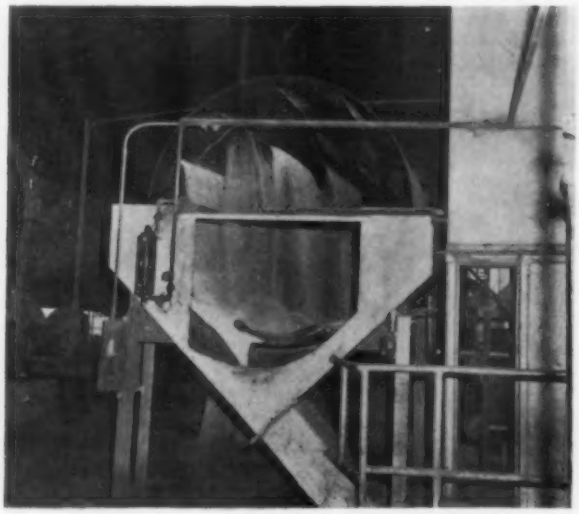
(*Continued on page* 138)

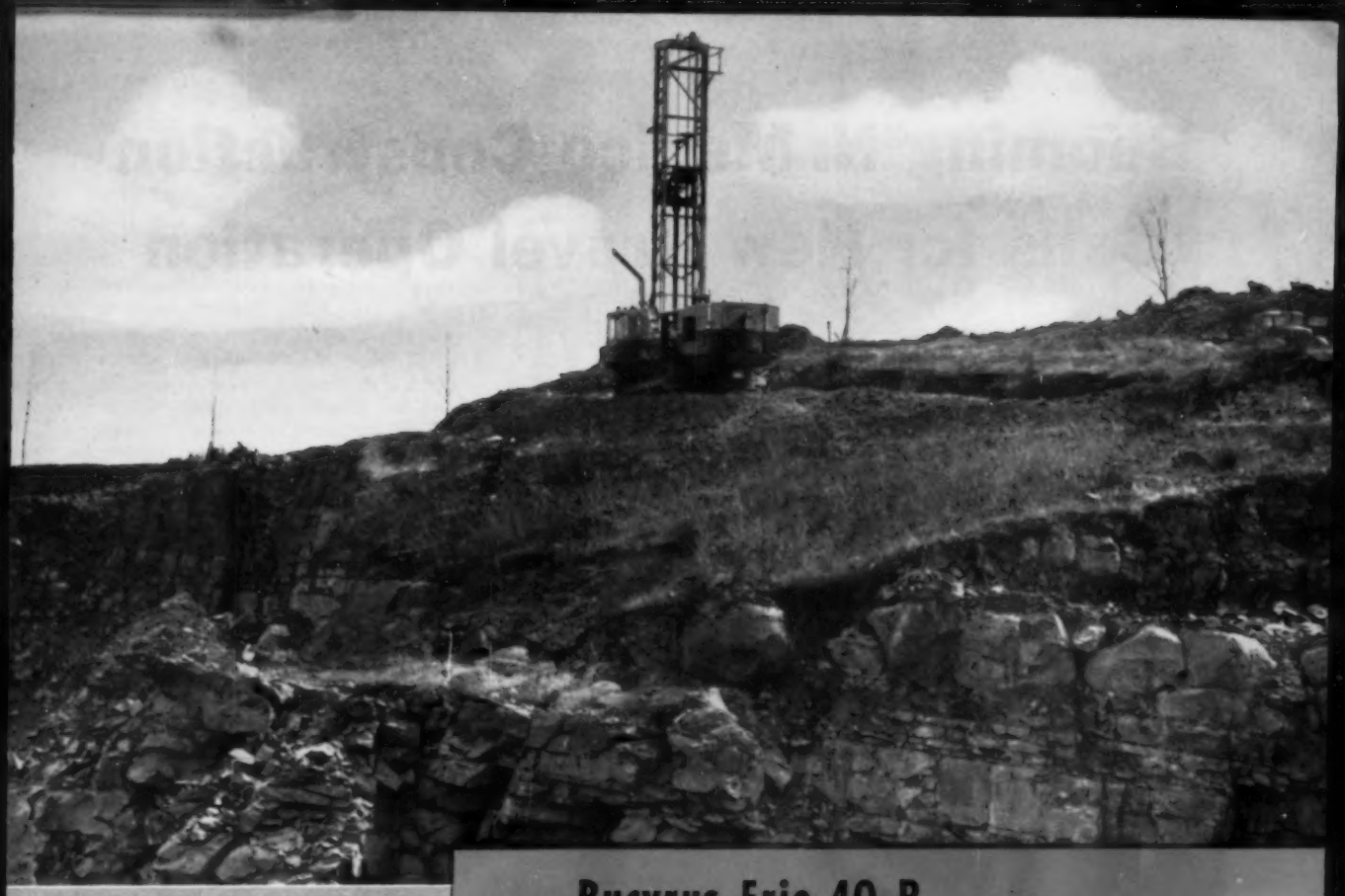
Ernest Zinkowski, assistant superintendent, is in direct charge of the granule plant operations.

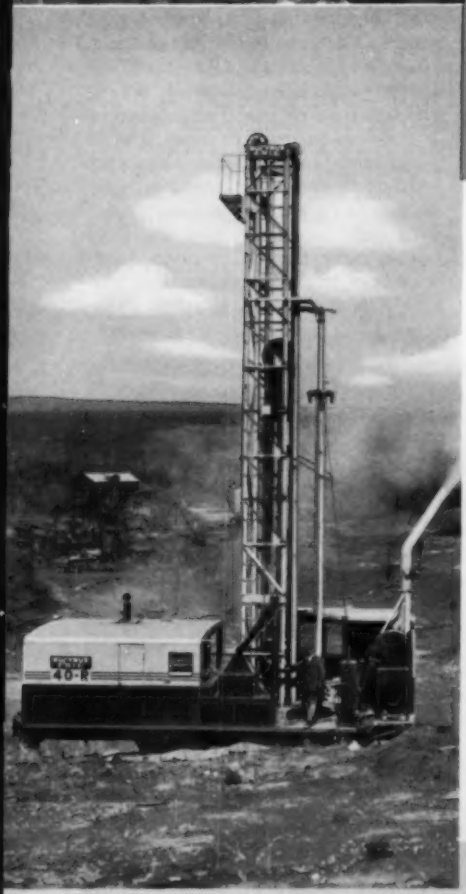
Below, left: Freshly color-coated granules are fed to this 6- by 50-ft. kiln, to be fired at temperatures which will permanently bind the coloring media.

Hot granules from the kiln are fed to this combined air-and-water spray-type cooler. Temperature of the granules is reduced to the point where they may be hand-held.









Bucyrus-Erie 40-R Solves Tough Drilling Problem For General Crushed Stone Co.

Quartzite segmented by fissures and seams is the big problem in the General Crushed Stone Co. quarry near White Haven, Pa.

To drill through this material economically, the company first tried large cable tool drills. These proved too slow. Two makes of rotaries were tried. Then in September, 1956, a Bucyrus-Erie 40-R rotary was put on the job, drilling 9-in. holes. Footage increased so noticeably that the 40-R was made a permanent part of the production set-up.

Features like these contribute to the 40-R's fine performance: air bailing cools the bit and cleans out cuttings, eliminates need for water—especially important during cold weather. Heavies pile up next to the hole, provide handy stemming material and permit dry sampling. A remote-controlled, power-driven drill pipe rack reduces manual effort. Hydraulically powered down pressure on the bit provides controlled load on drilling tools for maximum penetration. Ward Leonard electric control on rotation of the drill pipe permits drilling at the most efficient speed for a given formation.

Two Bucyrus-Erie rotaries are available—the 40-R for drilling 6¾- to 9-in. holes, the 50-R for drilling 9⅞- to 12¼-in. holes.

For more information on how these drills can bring new economies to your quarry, write us today! 64857C

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Booming N. Mexico Construction Calls for New Gravel Operation

By HARRY F. UTLEY

"NO VACANCY" signs were lighted on the hotels and motels in the town of Farmington, N. M., when the writer drove in a few months back, and the streets teemed with traffic. The reason? An oil- and gas-drilling boom in the Navajo Indian country round about, augmented by an epidemic of uranium fever.

According to Claud Adams, general manager of the San Juan Gravel Products Company, whose recently-built sand-and-gravel plant was the main object of our visit, Farmington had gained 35 percent in permanent population (now 15,000) in less than a year. Building activity was naturally at an all-time high, taxing the non-competitive capacities of the various local aggregates and ready-mix plants.

The batch plant had been erected earlier, about 1948, near the downtown section of Farmington, and until the new sand-and-gravel plant was built on the San Juan River a few miles east, a portable plant had been used to supply the needed aggregates.

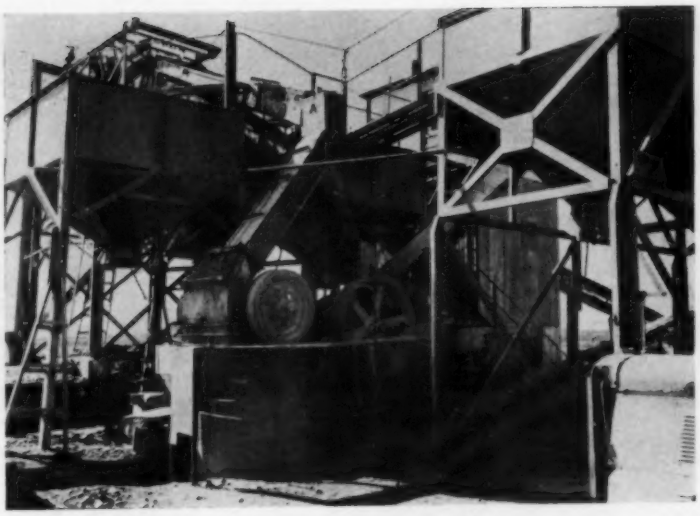
The San Juan operations are owned by and affiliated with the Albuquerque Gravel Products Company, headed by John and Eugene Sundt. The new gravel plant has a capacity of about 125 t.p.h. of washed and sized material, all of which is trucked into Farmington or to building projects or road jobs in the vicinity. Except during the severe weather in the winter months, production is carried on at near capacity.

The river deposit requires practically no stripping, and a Bucyrus-Erie 22B ¾-cu. yd. dragline exca-

Claud Adams, general manager (left), and A. C. Cockrum, superintendent.

A general view of the San Juan aggregates plant. Gravel is processed at the upper level, and sand below. The inclined conveyors in the foreground stockpile the sand.

Both jaw crusher and roll crusher are at ground level and in closed circuit, via return conveyor, with the screens.



vates and loads Ford dual-axle 10-cu. yd. end-dump trucks. Maximum haul to the 50-cu. yd. plant hopper is about one-half mile.

A 30-in. by 200-ft. belt-conveyor carries to a Cedarapids 4- by 12-ft. triple-deck scalping screen at the top of the plant. Plus 2½-in. off the upper screen deck chutes to a 24- by 36-in. Diamond jaw crusher, while plus 1¼-in. from the intermediate deck normally goes to a set of Pioneer double rolls. This first screen is equipped with washing jets, and the 1¼-in. and ⅜-in. gravels may both be binned as finished materials if desired.

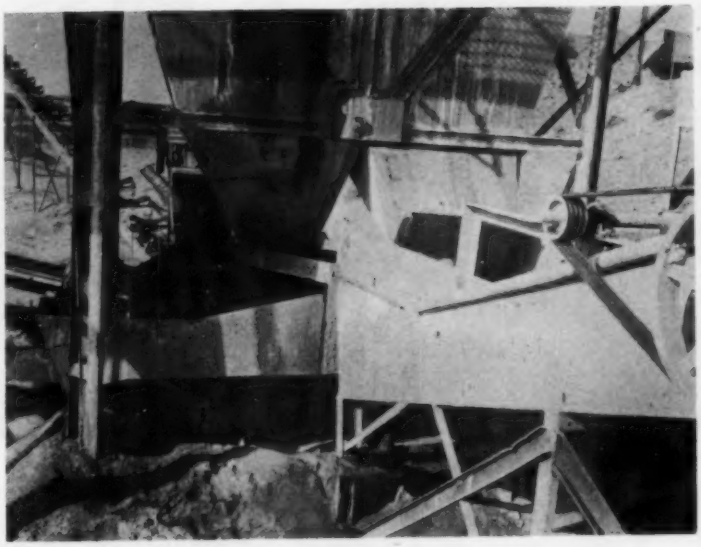
Another washing-and-sizing screen, a 42-in. by 7½-ft. Universal 3-decker ordinarily makes the bulk of the finished gravel products, however, while a Cedarapids 4- by 9-ft. double-deck screen at a lower level rejects pea gravel and passes the sands. Both crushers are closed-circuited with the gravel screens by way of a return belt. Four finished gravels—1½-in., 1¼-in., ¾-in., and ⅜-in.—are standard products and are separately stored in truck-loading bins having a combined capacity of 65 tons.

Three grades of sand — plaster, mortar, and concrete—are processed or blended from the sand-screen throughs by two Telsmith twin-screw dewaterer classifiers. The entire sand department is at a lower level than the gravel department, the feed being flumed from one to the other by gravity. Weir heights on the classifiers were extended and serpentine baffles were inserted into the lower ends of the tubs to break turbulence and aid settling. Thus, a large proportion of the minus 50-mesh product is saved before the dirty water overflows to the ponds. Sands are stockpiled by a pair of stacker conveyors.

Water for washing is pumped from a well by a 10-in. Fairbanks Morse pump driven by a 50-hp. G-E motor. The plant is of steel and concrete construction throughout. A. C. Cockrum is the plant superintendent.

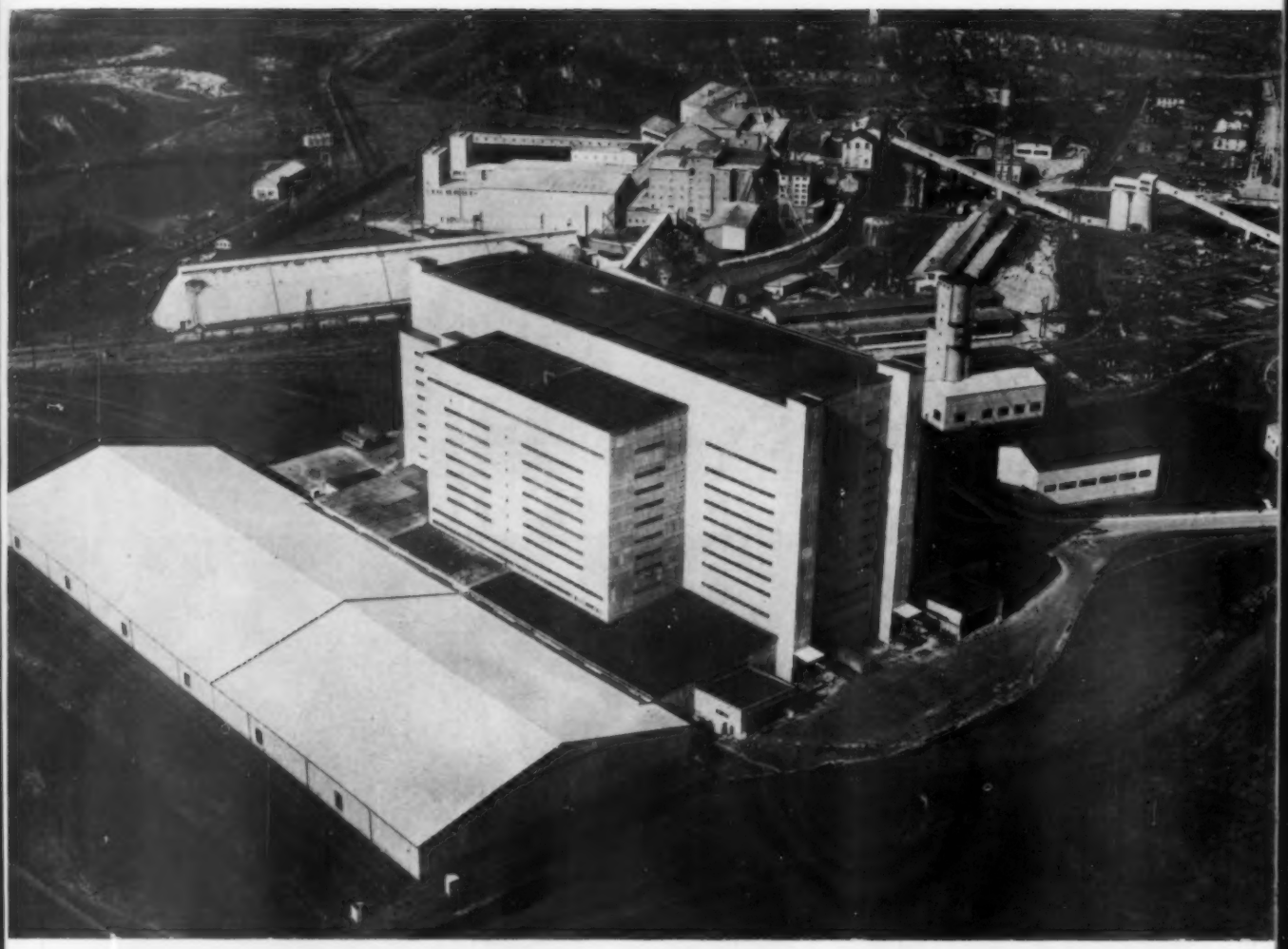
The batch plant in Farmington proper has a capacity of 600 cu. yd. daily and uses a large proportion of the sand-and-gravel plant output.

(*Continued on page* 138)



The serpentine baffle arrangement is visible here in the lower end of one of the sand-classifying screws.

The Farmington batch plant, showing the three aggregate silos and the 100,000-bbl. cement silo.



World's Leading Asbestos Operation..

underground mine, modern mill features in expansion of Canadian J-M

ANOTHER ON THE SPOT REPORT

WITH the recent completion of its new mill at Asbestos, Que., Canada, and the earlier sinking of a second main shaft to the underground workings in the largest known asbestos ore deposit in the world, Johns-Manville finished the most important single project in the expansion and replacement program undertaken in the last decade.

Already the world-wide leading producer of asbestos fiber, accounting for over 50 percent of Canada's annual production and more than one-third of the total world's output from all asbestos mines, Canadian Johns-Manville Co., Ltd., has raised its milling capacity to approximately 800 t.p.h.—over 5,500,000 tons annually—and has achieved an output of nearly 17,000 t.p.d. of ore from underground and open-pit operations combined.

The world's largest asbestos mill, recently completed by Canadian Johns-Manville at the Jeffrey Mine, Asbestos, Que. At the right of the 14-floor structure are the hoist house and headframe for the No. 2 shaft, which was another phase of the production expansion program.

By BUREN C. HEROD

The new mill, a 14-story steel and concrete structure with 972,000 sq. ft. (22½ acres) of floor area, is known as mill No. 5; it replaces mills No. 4a and 4b. Replacement of the old mills became necessary due to their location in an area which will be affected by caving accompanying the advance in underground mining, to their physical incapacity to accommodate expansion, and to obsolescent and inadequate material-handling methods.

Mining operations, for which the new shaft was recently added to increase production and hoisting capacities of the underground workings, had already undergone a material transition from the original entirely open-pit type of operation. By 1942 deepening of the pit, resulting from nearly 60 years of digging, had approached the point at which the management had to consider vertical development to offset the constriction of the lower pit levels, and to continue production within the mine limits.

Several mining methods were studied, and the underground block-caving system was adopted. Underground development was first started in July, 1944, with the sinking of No. 1 shaft about 1,800 ft. south of the ore body, and in February, 1950, the production stage was reached with the blasting of the first quarter of the undercut of the first block.

To augment hoisting capacity, a second shaft, similar to the first, was started in February, 1953, and completed in May of the following year. Located about 1,000 ft. southwest of No. 1, the new No. 2 shaft is equipped with skips of larger capacity — 15 tons, as compared with the 12½-ton units in No. 1. A connection has been made with the No. 1 shaft workings on the 750-ft. haulage level, and loading pockets have been established at the 940- and 1,240-ft. levels. All production is currently carried out at the 750-ft. level.

The impressive status of the present mining and milling facilities is the culmination of an interesting history of growth. Although asbestos had been discovered and mining operations had been initiated in 1876 at Thetford, only about 45 miles northeast, an outcropping of masses of long fibers at what is now Asbestos was regarded only as a local curiosity —one which was ultimately to be proven out as the world's largest known deposit. Approximately 75,000,000 tons of ore have been removed since the deposit was opened.

By 1881, the potential of the area had been brought to the attention of W. H. Jeffrey, an English colonel, who that year opened the mine which bears his name. The entire output, consisting solely of crude, was sold to the H. W. Johns Manufacturing Company in Manhattan, N. Y. Subsequent financial difficulties and ownership changes culminated in liquidation in 1916. The property was then

No, he is not conducting a victim to a dungeon torture chamber. He is working in a concreted slusher drift in the mine. Drawpoints can be seen on the left wall just ahead of and behind the slusher scraper. The material drops through the opening in the lower foreground into 10-ton ore cars in the cross-cut below.

The fans shown here are installed in a sealed fan room—the heart of all air-handling in the new mill. Drawing about 2,500,000 c.f.m., they provide a negative pressure of about 9-in. water gauge for the pull-through method of circulation. Both fiber aspiration and dust control (see bag compartments at right) are handled by these units.

taken over by a company formed for that purpose—Manville Asbestos Co., Ltd.—in which T. F. Manville held the controlling interest. In 1918 the company was reorganized and given its present name. Shortly after Mr. Manville's death in 1925 his heirs disposed of the greater part of their holdings, and only one of the original Manville family, H. E. Manville Jr., a nephew of the founder, has retained an active interest.

Initial workings in the mine—an open pit—were entirely hand operations. As the pit deepened, a transition in ore removal was made successively from hand labor, horsepowered derricks, aerial tramway, and locomotive haulage to the present use of 22½-ton Euclid trucks. At this time the pit is over 2,800 ft. wide, 3,300 ft. long, with a depth of about 350 ft. As noted previously, the deepening of the open pit led to the adoption of the underground development for maximum recovery through block-caving of the ore available within the mine limits.

Underground operations, which are designed to produce in excess of 20,000 tons per day, are based on development of 200-ft. square caving blocks with slusher drifts. The blocks extend upward about 400 ft. to the surface from the present 750-ft. mining level, and subsequent to undercutting are caved and broken due to the action of natural forces.

No. 2 main shaft, similar to No. 1, and hoisting ore removed from the same mining level, was bottomed in May, 1954. The entire shaft is steel-timbered and concreted, and is equipped with skip, cage, manway, and utility compartments. It is equipped with 14- and 10-ft. diameter Nordberg hoists, the former for ore and the smaller for men and service.

On the 750-ft. level, the only mining level established at present, three main haulage drifts have been driven northward through a pillar which provides protection for these drifts, as well as underground repair shops, storerooms, and other service facilities. With most of the level development and all of the mining being currently done on the west side of this pillar, crosscuts have been driven in that direction at right angles to the main haulage drifts on 200-ft. centers.

The greater length of the 8-ft. 4-in. wide and 9-ft. 6-in. high main haulage drifts is supported by steel and poured concrete walls and backs. The balance is mainly steel, supported with gunited walls and back. In driving the production crosscuts, the backs are excavated to a height of 20 ft. above the rail haulage level, and then a gangway is constructed with an 18-in. concrete floor, concrete walls, and an arched roof. The floor of the gangway is 11 ft. above that of the crosscut, and recesses are left in its walls for driving of slusher drifts at gangway elevation.

In each 200-ft. square block, eight slusher drifts are driven at right angles to the crosscuts from the gangway recesses. With 50-ft. intervals, four are driven 102 ft. long from the south side of a given block and four from the north side to a depth of 120 ft. This provides a staggering and an overlap of about 22 ft. in the central area of the block.

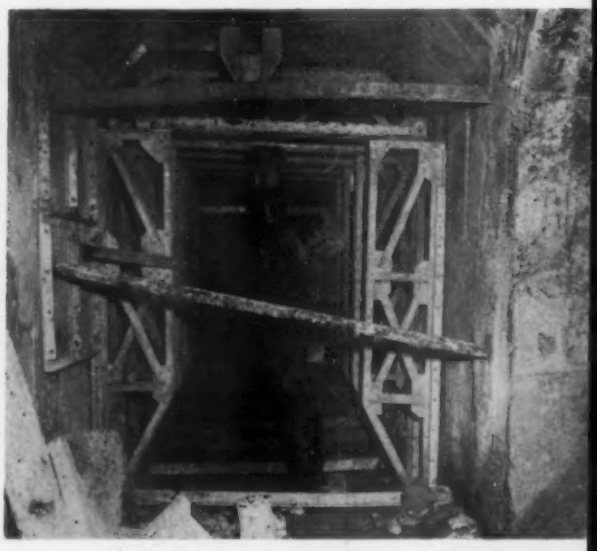
In the development of a slusher drift, the slusher hoist station is first cut. On the opposite side of the gangway the drift is then started with a 5- by 7-ft. pilot drive which is subsequently slashed to the full raw size of 13 ft. in height and a 10-ft. width. Drilling is accomplished with Copco jackleg air drills using chisel bit, ⅞-in. hexagonal steel. The lower third of a given round of holes is loaded, blasted, and mucked out with a 15-hp. slusher and a 36-in. scraper to clean the floor for concreting. Following the installation of a tail pulley post and bumper guides for the production slusher scraper, the concrete floor is poured.

The finished floor facilitates mucking out the balance of the material brought down from the drift back, as well as that slashed out from each of the drift's drawpoints. The latter are established on 35-ft. centers on the same side of the drift, or staggered on 17½-ft. centers from side to side. Drifts 1 to 4 (102 ft. long) on the south side of the block have five drawpoints, while the four drifts from the north side (120 ft. long) have six drawpoints.

With this mucking complete, the drifts are ready for concreting of walls and back. Aluminum forms of the panel and truss types with quick

Fed through a line from the surface placer, this underground concrete placer pumps ready-mix to areas of haulageway, crosscut, or slusher drift construction.

A view of typical panel and truss type aluminum forms used in concreting below ground, in this case a slusher drift opening. Here a workman is connecting a fitting to which concrete supply lines from the underground placer are attached.



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DODGE

PowerGiants

MOST POWER OF THE LOW-PRICED 3

This central ready-mix plant on the surface plays an important role in the mining operations. As much as 25,000 cu. yd. of ready-mixed concrete per year have been pumped from a surface placer in this plant to supply underground construction.

acting clamps are used in this work. Finished size of the concreted drift provides a 7-ft. width and 9-ft. height, with 18 in. of concrete in the walls, 1 ft. in the floor, and 3 ft. on the back.

In view of the impressive yardage of concrete required (25,000 cu. yd. per year have been poured to support haulage way, crosscut, and slusher drift openings in this underground development), the mine's central concrete mix plant plays a highly important role in the mining operations, and merits a separate description in this report.

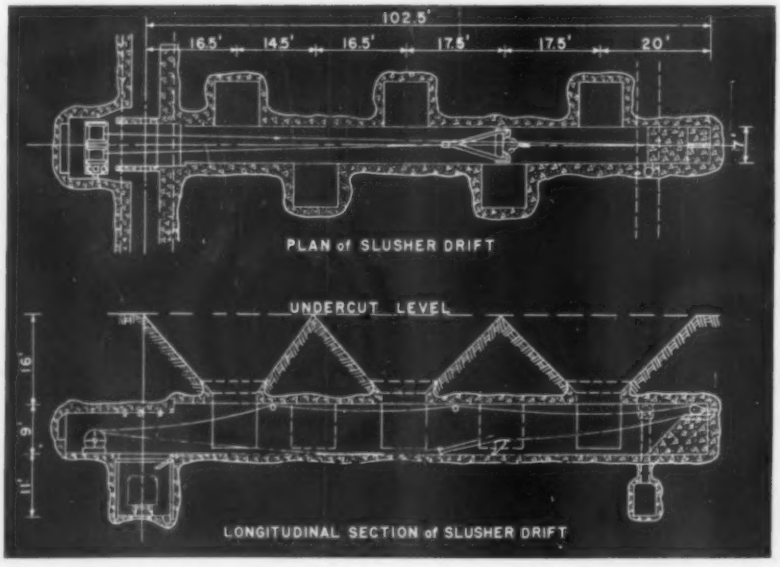
Considerable study was made by Canadian J-M engineers, as underground development advanced, on the possibilities of improvement to existing methods of placing concrete. A tour was made of an underground mining operation in the United States, where conditions were similar to those at Asbestos and where the method of concreting appeared to be doing a very good job.

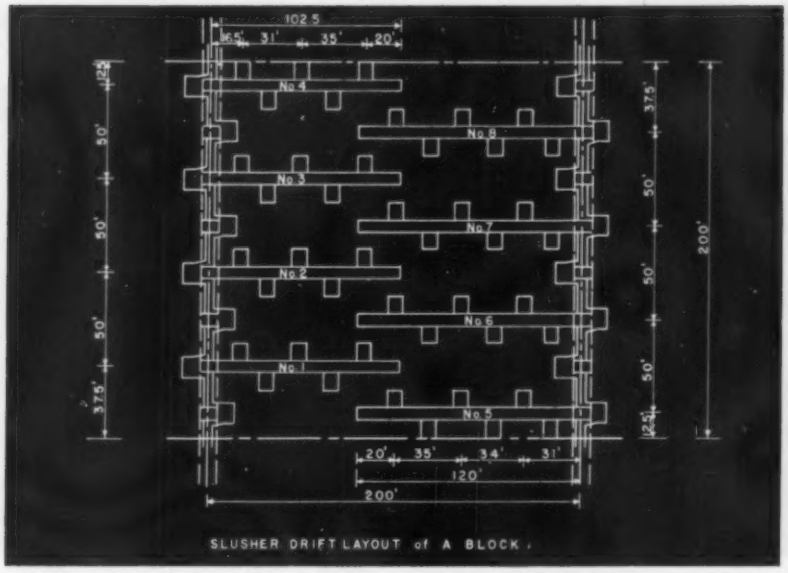
This investigation led to the decision to install a central mix plant on the surface along with necessary 6-in. supply lines from a placer above ground to a booster on the mining level. The mix plant is situated on the north rim of the open pit. Crushed stone and sand are trucked in (rock from the orebody is too soft) and stored in heated bins. Cement is received in rail bulk hopper cars and is also stored in bins.

With automatic control, the plant weighs the batch ingredients separately on batcher scales. The batch is mixed in either of two 1-cu. yd. mixers which discharge into a placer or into trucks for use on surface jobs. The placer, a Press-Weld pneumatic unit purchased from Blaw-Knox, is a steel box fitted with an air-tight sliding door on the top and a 6-in. discharge port at the bottom on one end.

After being received in the placer, the concrete is blown by compressed air through the supply pipe to the underground placer, which is identical to the surface unit. Standard 6-in. Victaulic-coupled pipe is used for the supply line which, from the surface placer, drops down the wall of the pit to a service shaft, thence down the shaft to the 750-ft. mining level, and along the No. 1 main haulage drift for a distance of about one-third of a mile to a 1-cu. yd. hopper at the second placer. The latter unit blows the concrete through distribution lines to the areas where the material is to be placed.

While the average is about 35 to 40 cu. yd., up to 80 cu. yd. of concrete has been placed in one 8-hour shift. The crew consists of seven men: a batcher and a placer operator on the surface; a placer operator, two form men, and two men making





SLUSHER DRIFT LAYOUT of A BLOCK.

pipe connections underground. The men at the forms have the important responsibility of seeing that the forms are filled properly. The two pipe men install pipe connections to forms at other locations ahead of time to provide the minimum of delay between pours.

Prior to the installation of this placing and supply method, all concrete for mining development was batched and mixed underground. Materials had to be transported on the same rail system used for the ore cars, and the equipment frequently blocked off working spaces. The new setup has eliminated these delays and has considerably speeded up other underground operations. In addition, concrete can be placed at a much lower cost per cu. yd., and a more consistent mix can be made.

Each slusher drift is equipped for production with a Joy Sullivan or Ingersoll-Rand 125-hp. electric slusher using 1¼-in. cable and 6-ft. scrapers with either folding or rigid type blades. To develop block caving of the overlying orebody, a raise is driven upward from one of the slusher drift draw points, and an undercut drift is then driven the full length of the underlying slusher drift and 16 ft. directly above it.

From this undercut drift, undercut drilling is started with horizontal holes drilled to a depth of 25 ft. In addition, the remaining draw points in the underlying slusher drift are connected with the undercut level by drilling and blasting to required dimensions to accommodate expansion in the muck.

The remainder of the undercut is then blasted out in sections, retreating from the open face. Undercuts of one-third to one-half of a block are usually shot at one time. A normal shot takes about 14,000 lb. of 1½- by 8-in. 40 percent Forcite—equal to 1.36 lb. per ton of rock broken. Muck is withdrawn immediately to allow caving to start. It is usually several weeks or months before caving gets underway, and once it has started, it works its way up to the surface by doming and spalling. A strict schedule of draw from the caved ore is followed, so that sufficient natural breakage of the ore is realized to minimize blasting at the draw points.

Slushed to the lip of the slusher drift, the ore is discharged through a 5- by 8-ft. opening in the gangway floor directly into 10-ton ore cars spotted in the crosscut below the slusher drift lip. The latter extends downward from the drift floor at 33 degrees and protrudes 6 in. over the edge of the car.

All trackage in the mine (about 5 miles) has 85-lb. rail with a 36-in. gauge. Goodman and General Electric 15-ton combination battery-trolley type locomotives are used to haul the four production trains, of ten cars each. Train traffic is controlled by two-way radio from a dispatcher station centrally located in the level's haulage system. A green and red light signal system is also operated from this station which is a 9- by 12-ft. concreted room, 10½ ft. high. With three main haulage drifts, one-way traffic is provided for both ingoing and outgoing trains. A one-half percent grade in favor of the load has been established.

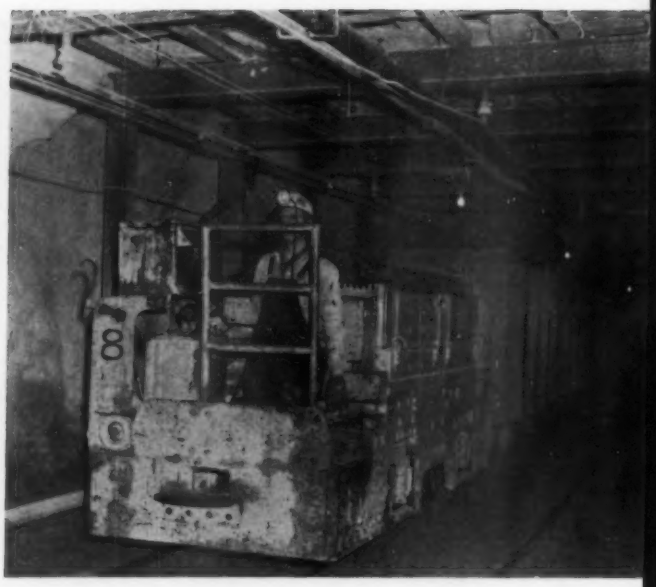
Ore cars are dumped two at a time in the rotary tipple installed near each of the two main shafts. Both tipples actually consist of two independent one-car units and are placed end to end on a spacing that will allow the car centered in each to be dumped without uncoupling. Rotated to one side, the tipple dumps into an ore bin, and on the other, into a waste bin. The bins are lined with steel plate anchored in concrete.

On the 816-ft. level below the tipples, concreted crusher rooms are located. Installed in each room is a battery of three 48- by 60-in. Traylor jaw crushers with 200-hp. drives, fed by Jeffrey vibrating grizzly feeders below the ore and waste bins.

No. 1 crusher is fed from the waste bins with crusher discharge and grizzly throughs both discharged into a

Underground train traffic is controlled by two-way radio from this dispatcher station centrally located on the haulage level.

A preliminary slusher drift excavation, showing the scraper.



Ten-car production trains are hauled by 15-ton battery-trolley locomotives.

waste bin. Both No. 2 and No. 3 are fed from the tipple ore bin. While No. 3 discharges only into a crushed ore bin, discharge from No. 2 may go to either bin. The crushed ore and crushed waste bins are identical units —12- by 16-ft. and 56 ft. in depth— on 29-ft. centers beneath No. 1 and No. 3 crusher pits.

From the bottom of these bins, the material is chuted past air-actuated arc gates to a common loading pass, through which a pair of 12½-ton capacity loading pockets at the 940-ft. level are supplied. Flow into these pockets is controlled by air-actuated guillotine gates, and that from the pockets into the skips in the shaft by air-actuated quick-acting hinged gates.

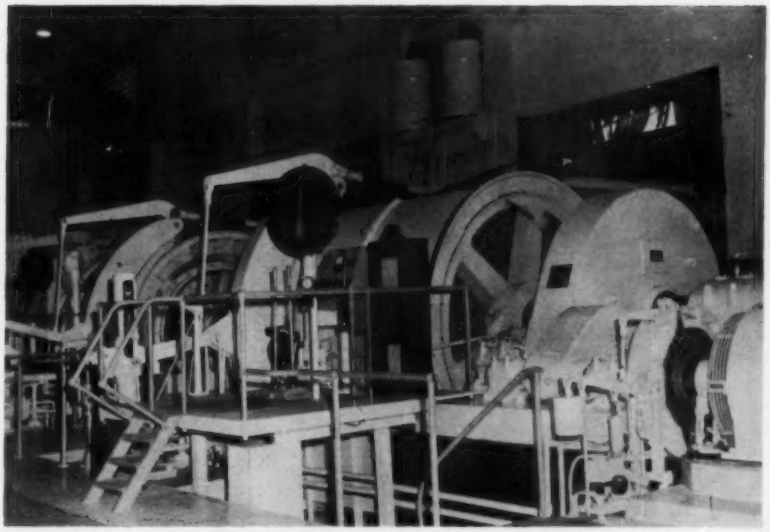
Left: Ore cars are dumped in pairs in the rotary car tipples. Rotated to one side, they discharge into an ore bin, and to the other, into waste bins. The bins are lined with steel plate anchored in concrete.

Right: A view in one of the two underground crusher rooms. Three 48- by 60-in. jaw crushers are installed in each of these rooms on the 816-ft. level. At the left are chutes and feeders from the ore and waste bins that are supplied from the rotary car tipples on the 750-ft. level.

Hoisting rate in the new shaft is 1,000 t.p.h. with 15-ton skips, while in No. 1 the rate is about 600 t.p.h. with 12½-ton skips. Headframes of the two main shafts are similar. Constructed of concrete by means of a sliding form with which all compartments were poured in one continuous operation, they stand approximately 130 ft. high from shaft collar to top.

The man hoist for No. 1 shaft is a 200-hp. Nordberg amplidyne-controlled unit with a single 10-ft. diameter drum grooved for 1⅝-in. wire

Man and ore hoisting equipment in one of the hoist houses. Ore skips in the new shaft, No. 2, have a capacity of 15 tons, while those in the older shaft are 12½-ton units.



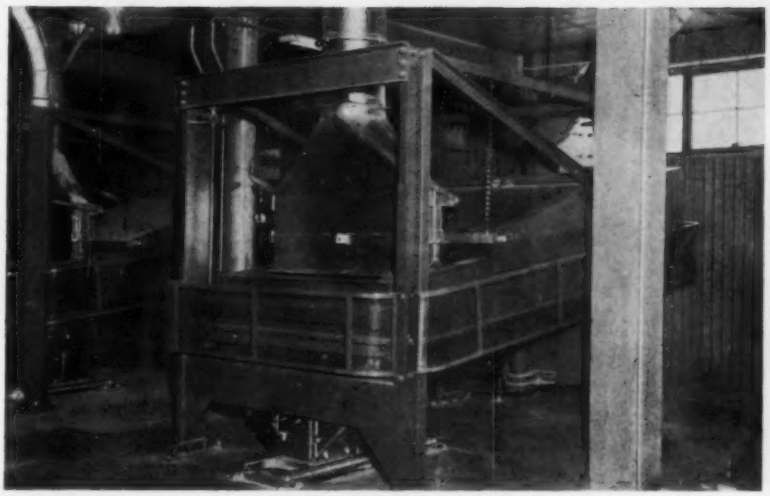
rope. Normal hoisting speed for the 50-man cage is 500 f.p.m. The ore hoist for this shaft is a 1,000-hp. unit, also Nordberg, with two 10-ft. drums grooved for 1⅝-in. rope. A maximum hoisting rate of 1,200 f.p.m. is available. No. 2 shaft is equipped with the two Nordberg hoists noted previously — one 1,750-hp. unit (eventually 3,500 hp. will be provided) with a 14-ft. drum for ore skips, and the other a 300-hp. unit with a 10-ft. drum for men and service. Wire rope used on these hoists is 2 in. in diameter.

Skips are discharged at the surface into 300-ton live capacity surge bins erected adjacent to the headframes. A vibrating feeder below each bin supplies a 36-in. transfer belt on which the ore or waste is transported to surface bins for the respective materials. The ore bin, *via* two underlying vibrating feeders, supplies the mill conveyor belt. While the waste bin is ordinarily discharged into rail cars, provision has been made to pass material directly to the mill feed belt in the event that this bin is also needed for ore.

Prior to disposition in a 60,000-ton capacity dry rock storage building, the ore from both underground and open pit operations is further reduced and/or dried. A pair of primary crushers similar to those underground accomplish primary reduction of the open pit ore, which is then fed along with the material from underground to a trommel with 3-in. openings.

Undersize, which holds the bulk of the contained moisture in the ore, is transported to the 12 horizontal and vertical oil-fired driers, while the trommel oversize is sent to a pair of 4¼-ft. Symons cone crushers set to produce the maximum size of 2½-in. Discharge from the latter is passed over a pair of shaker screens fitted with 1½-in. opening screencloth. Throughs from these units join the trommel undersize in feed into the driers, while the plus 1½-in. ore joins the drier discharge and is passed over a battery of rod deck screens with ¾-in. spacing.

Ore retained on these screens is fed to a group of five Symons 4-ft. cone crushers from which the dis-



A typical screen installation in the new mill, showing the aspirating hood through which fibers are drawn to enter lines leading to cyclone collectors.

In these fiberizers, ore from which fibers were not aspirated on the screens is cracked open to facilitate subsequent aspiration.

charge joins the screen throughs and is conveyed into the dry rock storage building. With the driers operating at temperatures of 1,600 to 1,800 deg. F., the dried ore enters storage with a moisture content lower than the 2 percent maximum considered necessary for efficient milling. Latent heat in the stored material serves to drive off further moisture during the minimum 24-hour storage period.

Reclaimed from the storage *via* Hardinge feeders and a conveyor belt in a tunnel below the piles, the ore is fed to a battery of Short-Head Symons cone crushers and then transferred to the mill feed conveyor. On the latter 36-in. inclined belt, the ore is raised to the 11th floor of the new mill, where it is distributed by Jeffrey shuttle conveyors into a line of 50-ton surge bins ahead of the 12 primary rock lines.

With respect to the design of the new mill, the firm lays no claim to the development of revolutionary milling techniques; however, company engineers fully utilized their experience with the old mills. In the new facility, they have eliminated the poorer mechanical features of the old setup and have emphasized improvement of recovery and quality control.

In designing mill No. 5, the usual belt and bucket elevators were almost entirely replaced by gravity chutes or belt conveyors. Screw conveyors with T-hangers, which were a source of trouble in the old mills, have been superseded by longer, heavy-duty screws or staggered flights of screws with external bearings and no T-hangers, thus eliminating a substantial amount of foreign material from the milling circuit.

Rubber-lined cyclone collectors proved their worth in the old mills in recent years, and as a consequence, collectors and companion lines in the new mill have been provided with full Linatex lining where necessary; *i.e.*, all those in the rock lines are so equipped, but not the final units in each system, since granular material has been eliminated in the earlier stages of the milling process.

In view of the number of pipelines and chutes, a distinctive color coding is used to identify various mill process lines, thus facilitating operation and maintenance. In addition, individual items of equipment have been numbered and lettered to simplify identification and tracing of the mill circuits.

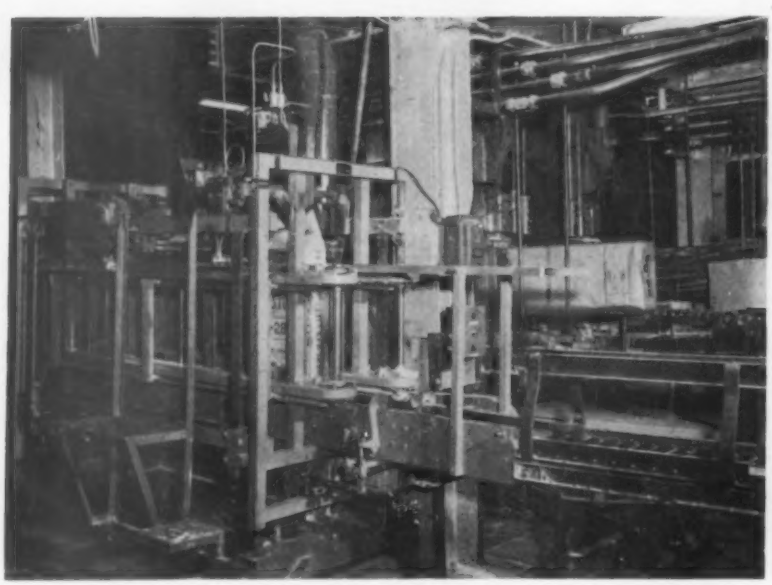
Briefly stated, the milling operation involves a gravity flow of the ore from the 11th floor down through the mill over 6 screens in each of the 12 primary rock lines. In this process it is also subjected to two stages of impact breaking to release fiber from the rock only as rapidly as it can be removed by the succeeding screens. Ore remaining from this flow is returned to the 11th floor, where it is started on its way through 10 secondary lines with 6 screens and another impact breaking stage. Rock remaining from this flow is discharged from the mill on a tailings conveyor.

A Hardinge constant-weight feeder below each mill feed bin starts the ore at a controlled rate on its flow through the respective primary rock lines. The successive screens on which the fiber is recovered in these circuits are Hall-Donovan units, each equipped with an aspirating hood through which the fibers are drawn to enter lines leading to cyclone collectors. Longer fibers collected are discharaged to a battery of graders, while the shorter fibers continue with the air stream to the dust collection system.

Heavier material not aspirated from the above screens ultimately reaches the fiberizers — Johns-Manville designed equipment—where it is cracked open to further separate the fibers from the rock. This material is fed through secondary processing lines similar to the primary circuits, the fibers being aspirated and

(*Continued on page* 136)

Left: Automatic batching of certain grades of fiber is accomplished by this equipment. As many as five different grades may be blended in varying amounts. (Note the arms on the scale face.)



Below: A section of the packing room. The company has developed pressure packers that compress fibers into 100-lb. slugs which are extruded into bags. A bag volume of only 1½-cu. ft. is required.

NOW...DRILL 9" HOLES WITH THE NEW JOY 59-BH CHAMPION

This world-famous pioneer rotary-air-blast-drill has adopted many of the features of its big brother, the Super-Heavyweight, to give you these advantages:

MORE STABLE DRILL STRING through use of round pipe . . . BETTER AIR CIRCULATION and cuttings removal . . . FASTER DRILLING—faster retraction of hydraulic feed averages total of only 3 minutes on a 51′ hole . . . EXTENDED 55′ MAST permits drilling 50′ hole without adding pipe . . . BETTER MOBILITY —hydraulically raised and lowered mast is left assembled during long moves . . . 9" HOLE allows wider hole spacing, economical use of large diameter powder.

This all adds up to new records in low cost per ton of rock. Get the whole story on the 59-BH. Write to ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

Write for Bulletin 168-26

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PAVING BREAKERS • SHEETING DRIVERS • DRIFTERS • PORTABLE HOISTS • FANS AND BLOWERS • PORTABLE SAFETY LIGHTING

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AIR HOSE

This is the hose built to take the most brutal treatment. So strong it snaps back even after being battered by a loaded Model LLD Euclid — a gross weight of 203,300 pounds!

When you consider that 45% of air hose failure is caused by *external* conditions, Boston Concord Yellow Jack is definitely the air hose to choose for your toughest jobs. It has the stamina to handle repeated rugged impact . . . the strength to withstand the highest internal pressures.

Boston Concord Yellow Jack's bright yellow cover makes it easy to identify.

Whatever your hose needs, there's a BOSTON Hose for you . . . and a BOSTON man nearby to help you solve your problems.

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More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

BULLETIN NO. 1126, published by the *Traylor Engineering and Manufacturing Company,* contains illustrations, cross-section drawings, complete specifications, and features of Traylor TC gyratory crushers. (1)

VIBRATING PAN-TYPE "OS-A-VEYOR" and grizzly feeders are detailed in a catalog just published by the *Simplicity Engineering Company.* Specifications and engineering information on six models of Simplicity feeders are given. (2)

FRONT-MOUNTED EQUIPMENT manufactured by the Fleco Corporation for use with Caterpillar track-type tractors is illustrated in a folder containing application photos, illustrations, and brief descriptions of the various attachments. (3)

A BAILEY CONTROL SYSTEM applied to a new kiln at a cement plant increased kiln capacity, according to Performance Report K10.1-2, available from the *Bailey Meter Company.* The Report gives complete details of this specific installation. (4)

SHAWNEE HYDRAULIC EARTH-MOVING TOOLS—the "Chief" backhoe Model D90 and the Loadmaster Model LM-3A for the International W-400—are featured in a brochure issued by the *Shawnee Manufacturing Company, Inc.* (5)

MODEL WN-224 AIR COMPRESSOR, a heavy-duty industrial model in the 350 to 1,000 hp. range, is described in literature prepared by the *Joy Manufacturing Company.* Three standard single models and 3 "Twin Unit" models are available. (6)

THE "HYDROCONE" CRUSHER is the subject of a new booklet issued by the *Allis-Chalmers Manufacturing Company.* Construction and design features are detailed, and product analysis and product shape are discussed. (7)

HEAVY-DUTY LOW-BED TRAILERS, manufactured by the *Birmingham Manufacturing Company, Inc.,* are pictured in Catalog E. Special-type trailers made to order are shown, and general specifications are included. (8)

MODEL 650 SERIES ROTARY BLAST HOLE DRILLS, designed by the *Reich Brothers Manufacturing Company* for shot holes in strip mines and quarries, are discussed on a data sheet containing illustrations, specifications, and descriptive information. (9)

THE HENRY TS-40F TRACTOR SHOVEL for John Deere 420 and 40 crawlers is pictured in a brochure offered by the *Henry Manufacturing Company, Inc.* Specifications and features are presented. (10)

THE PERFECTION LINE OF DUMP BODIES is described in literature available from the manufacturer, the *Perfection Steel Body Company.* Illustrations, specifications, and features of the various models are contained. (11)

A CATALOG OF LUBRICATIONS FITTINGS and accessories, offered by the *Alemite Division, Stewart-Warner Corporation,* lists specifications, dimensions, and applications to facilitate the correct selection of fittings for any requirements. (12)

"PRINCIPLES OF TROUBLE SHOOTING FOR CUMMINS DIESELS," a bulletin released by the *Cummins Engine Company, Inc.,* lists common complaints which may be encountered during the service life of a diesel and notes causes of the trouble. (13)

TWO MODELS OF THE PAYHAULER OFF-THE-HIGHWAY TRUCK—the 24-ton "95" and the 18-ton "65"—are fea-

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tured in a bulletin offered by the *International Harvester Company*. On-the-job reports and photos and brief specifications are included. (14)

FEATURES OF THE AUGER-MATIC BAG PACKER are detailed in a booklet available from the *E. D. Coddington Manufacturing Company*. Various models are illustrated, and practical applications for Auger-Matic installations are diagrammed. (15)

NEOPRENE LUBRICAPS, described in literature published by *Lubrication Devices*, prevent dirt, grit, moisture, and any other foreign substance from being introduced into the bearing through the grease fitting. (16)

A TRUCK-BUS LUBRICATION AND MAINTENANCE PROGRAM, devised by the *Cities Service Oil Company*, incorporates all necessary features to insure longer vehicle life, fewer, lower repair bills, lower cost per ton mile, and less inconveniencing down time. (17)

"WHAT DO YOU DO WHEN V-BELTS STRETCH OR BREAK?", a new folder offered by the *Manheim Mfg. & Belting Company*, answers questions on V-belt maintenance, inventory, wear, and vibration. (18)

EARTH DRILLING ACCESSORIES manufactured by *Mobile Drilling, Inc.*, are described in a catalog-packet which contains information on the company's complete line of mobile rotary drilling rigs. (19)

CONVEYOR, ELEVATOR, AND POWER TRANSMISSION CHAINS are described in a catalog published by the *Moline Malleable Iron Company*. The catalog shows a method of installing chain and how to identify chain attachments. (20)

SPEEDLIFT TWIN-CYLINDER HOISTS for dump trailers are illustrated on a specification sheet published by the *Daybrook Hydraulic Division, L. A. Young Spring & Wire Corporation*. (21)

"REXARC KEEPS EARTH-MOVING EQUIPMENT ROLLING" is the title of a 14-page brochure on Rexarc automatic welders and positioners and components manufactured by *The Sight Feed Generator Company*. (22)

WIRECO SLINGS AND FITTINGS are featured in Catalog No. 55-S, available from the *Wire Rope Corporation of America*. Characteristics and components of Mazzella slings are included, in addition to diagrams and capacity tables. (23)

WELDED STEEL CONVEYOR PULLEYS for belt conveyor and bucket elevator systems are covered in Bulletin 5781, published by the *Chain Belt Company*. Drum types and the self-cleaning wing-type pulley, are included. (24)

HERMAN NELSON ROLL-O-VENT AIR HANDLING UNITS are described in a new product bulletin released by the *American Air Filter Company, Inc.* Dimension drawings and charts for the basic unit and for accessories are included. (25)

"FINGER TIP FACTS ON CLEVELAND WORM GEAR DRIVES," a 16-page brochure, provides useful information on the complete standard line of speed reducers, worm gear sets, and special units manufactured by *The Cleveland Worm & Gear Company*. (26)

AUTOMATIC PACKAGE CONTROLS, suitable for almost any industrial application in which a chemical or mechanical function can be measured electrically, are described in a new catalog issued by *Tipp-Tronic, Inc.* (27)

JUNE, 1957

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It took only one man with a primitive wheelbarrow to haul away the production of this seventeenth-century grinding mill. For all of its grinding was accomplished by just four iron-headed stamps.

Today's grinding is as fast as yesterday's was slow. The modern mill produces many tons of ore in a single day, thus making possible our "metal age" civilization. This amazing production is possible largely because modern mills utilize efficient grinding media like the grinding balls and grinding rods produced by CF&I. Since they are always produced from special analysis steels that have the proper balance between toughness and hardness, CF&I Grinding Balls and Grinding Rods assure optimum grinding ability and maximum wearing ability.

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(*From page* 130)

collected, and the residue from all lines being removed from the mill on a tailings conveyor.

In the trommel type graders, the fibers are processed so as to discharge the longer material from one end and the shorter from the bottom. These fibers are then fed to rotary mixers, in which the graded materials are mixed to insure uniformity of product in the more than 60 grades sold.

From the mixers, the various products are distributed *via* chutes and screw conveyors to weighing hoppers that automatically weigh out 100-lb. batches of fiber for delivery to the pressure packing machines. Developed by the Johns-Manville organization, the latter units constitute a substantial improvement in the material-handling phase. With this equipment, fibers are compressed into uniform rectangular blocks approximately 7 by 15 by 30 in. in size, and the slugs then extruded into paper or jute bags. The 100-lb. slugs require a bag volume of only about 1½ cu. ft.

The bagging cycle is varied in accordance with the length of the fiber being packed, and the paper packages are then passed through a Ferguson Packomatic, where the tops are automatically folded, the flaps glued, and the bag sealed. These are then moved on roller conveyors to a palletizing area prior to accumulation in loading storage bays.

In view of the impressive quantity of air required for processing and dust control—50 to 60 tons per ton of finished product, or 2,500,000 c.f.m.—this phase of the mill design was of prime importance. The heart of all air handling in the mill is located on the 12th floor, where a bank of 18 Sturtevant fans are installed in over an acre of floor space. Driven at 1,200 r.p.m. by 350-hp. Westinghouse motors, these fans provide a negative pressure of about 7-in. water gauge for the pull-through method of circulation.

The fan room, which also houses American Wheelabrator bag filtration equipment, is completely sealed off from the rest of the mill. During operation it is under a negative pressure of about 9-in. water gauge, and entry as well as exit is made through air locks. The room is fully open, with the fans mounted on a 28-ft. wide center aisle, and the floor space to both sides is reserved for the dust filter bags.

About 75 percent of the total air required in the mill is for fiber aspirators, and approximately 25 percent for dust control. In the former, air is drawn through the screen aspirators to pick up fiber and then to cyclone collectors to drop the fiber as described previously. The dusty air from the collectors then enters the first of four main air plenums. With reduction of air velocities in these plenums, the fibers escaping the collectors are progressively segregated and settled out. They are ultimately recovered by drag button conveyors and transferred to storage bins for the production of floats.

In view of the top priority accorded dust control, every point at which dust is created in the processing is placed under negative pressure, with the aspirating lines connected to vertical risers that enter the air plenums. Once the dusty air has entered the plenums, it passes through controlled gates into hoppers below the 48 filter bag compartments and then upwards into the bags.

Clean air escaping the bags is drawn into the fan room and discharged by the fans into an underlying clean air plenum. From this chamber, the filtered air may be exhausted to atmosphere during warm weather, or recirculated to the various mill floors in winter months. This operation is significant in view of the fact that energy released as heat from the mill processes approximates 11,500,000 B.t.u. per hour.

With each bag compartment in the filtration system containing about 1,200 cotton sateen bags 5 in. in diameter and 14 ft. long, nearly 30 acres of cloth area are contained in the system. Program timers for the system automatically pick compartments, close dampers, shake the bags, allow a settling period, and then change to another group of compartments.

The floats (very short fibers) collected in the bag filters are stored in bins in the floats section of the mill, as noted above. Tailor-made to specification, blended products of different ingredients from these bins are automatically weighed and batched with Fairbanks-Morse scales and weigh hoppers. These materials represent the only fiber in the mill that is not pressure-packed.

Sampling for quality control is an important operation in this new mill. Each mixer discharge opening is fitted with an automatic sampler which can take cuts from the discharge of 0 to 60 seconds' duration and at intervals of 0 to 60 minutes. For example, a frequency can be established to provide a sample representing each 20 bags produced. Correlation between the sample and the actual production is obtained by means of a numbering device on the bag-sealing equipment. Lot numbers are advanced one digit after each sample is tested, and the fiber may be identified with the appropriate test dates.

Fiber produced on a 3-shift basis is generally accumulated in carload lots. Prior to loading, the quality control laboratory evaluates the samples that represent the respective lot, and when approval is made, the lot is loaded. While pallets of bagged fiber are stored in loading bays on three shifts, loading is carried out on the day shift. A 4-track rail loading area provides for spotting of 32 cars at one time. This is augmented by 12 truck loading positions.

The equivalent of 60 carloads of fiber is shipped from this mill daily, with about 35 percent destined for company factories in Canada and the United States.

Other interesting points concerning the Jeffrey mill—the largest single asbestos fiber production unit in the world—include the following: aspiration and dust control involve 7 and 4 miles of piping, respectively; there are 10 miles of rock and fiber chutes; electric conduit has a 30-mile length; and there are 12 miles of dust control wiring. In addition, the mills requirements are met by a total connected horsepower of 15,000.

While the expansion of mining and milling operations at Asbestos represent the project of greatest consequence in Johns-Manville's recent history, the company has made important steps in other areas. In 1949 operations were initiated at Matheson, Ontario, with the Munro mine and mill. (See PIT AND QUARRY, September, 1955, p. 74.) Although it was started as an open pit mine, the Munro operation will parallel the history of the Jeffrey mine, inasmuch as the former is presently being also converted to underground operations.

At the Jeffrey mine and mill, operations are carried out around the clock by approximately 2,300 men. While these facilities, a few years ago, were operating on a 5-day week, peak demands for the mill's products have made 6-day operating mandatory.

Administrative head of this impressive, modern mine and mill is Karl V. Lindell, vice-president and general manager of the asbestos fiber division, Canadian Johns-Manville, Ltd. Key personnel include: Joel Eby, mine manager; H. C. Marek, open pit superintendent; H. H. Waller, underground superintendent; and J. L. Gaitshore, acting mill superintendent.

Marble Products

(*Continued from page* 106)

operations were started, and Sykes H. Young, who succeeded him as president. Evan T. Mathis, Jr., is sales manager, and Don Mosley is superintendent. The plant was designed by the John J. Harte Company of Atlanta to the specifications of Mr. Mosley, who has been connected with the crushed stone business in this area since 1922. The Trans-All Company, Birmingham, Ala., supplied the conveyor idlers and the steel for the conveyors and buildings. Goodyear conveyor belting is used throughout. American speed reducer drives are used on all belt conveyors. Most other drives are V-belt, and most of the motors are General Electric—100 hp. for the primary crusher, 75 hp. for the secondary crusher, and 100 hp. for the hammermill.

Basic Chemical Corp.

(*From page* 101)

for a variety of products including poultry grits, stucco, plaster, and filtration sands. Throughs are ground to extreme fineness — 99 percent through 325-mesh, by a Denver 4- by 10-ft. ball-mill and a Raymond air-separator equipped with double whizzers. End use of this fine marble dust are many; the paint, pigment, plaster, and putty trades employ it as an ingredient or extender. It is also gaining a growing market for rock-dusting in mines.

The 4- by 60-ft. Gould rotary kiln which burns the lime went into operation in August, 1956. As mentioned, feed normally consists of minus ¼-in. stone, which is introduced by a Syntron feeder. Initial output was in the range of 22 tons per day. The kiln is fired with No. 6 fuel oil, the burner being a North American dual-type unit since natural gas will soon be available.

The shell is lined with 50 percent high-alumina fire brick, the kiln sloping ½ in. per ft. and turning at about 80 r.p.h. Complete calcination is obtained with a burning zone temperature of 2,100 deg. F. The kiln is on natural draft with a 75 ft. steel stack. Water sprays arrest the dust in the exhaust gases. Initially the controls are manually operated.

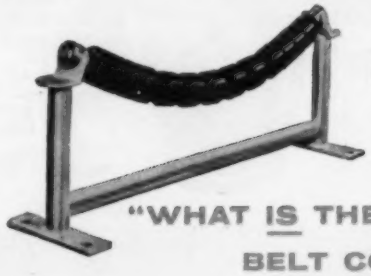
The lime discharges to a soaking chamber and is then carried by a 14-in. by 35-ft. drag-chain conveyor to the boot of an elevator, which lifts it for storage to a 75-ton steel bin. Travel speed of the drag-chain is synchronized with kiln speed; and by the time the lime reaches the elevator, it is relatively cool (about 225 deg. F.) A continuous hydrator of the pugmill overflow type permits a yield of about 4 tons of hydrate hourly. The hydrated lime is deflocculated in a small hammermill and air-separated at 40 microns, oversize returning to the hydrator.

St. Regis packers are used to sack the quicklime, hydrate, and various stone products.

The company's market area covers the entire Intermountain West. The booming uranium industry is providing another important product outlet, the demand coming from the many reduction plants erected recently in the area fanning out from the Colorado-Utah border. Shipments leave the Glenwood Springs plant both by rail and highway.

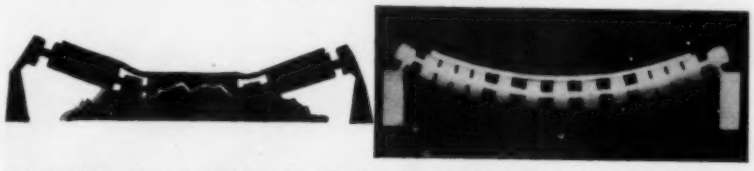
Capacity of the Ugahda Cement Industry's plant at Tororo was tripled recently when a new kiln, capable of producing 100,000 tons of cement annually, went into operation. With the new installation, the plant has a 150,000-ton per year capacity.

Cement production in Mexico totaled 2,276,660 tons, worth $36,000,000, in 1956, eight times the production of 20 years ago.

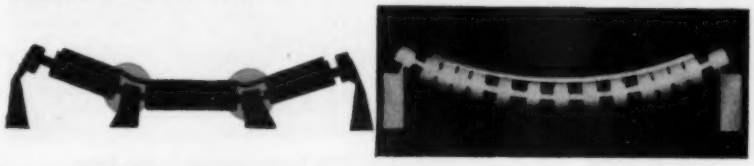


We've been asked...

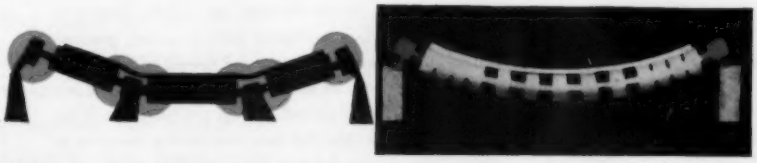
"WHAT IS THE JOY LIMBEROLLER BELT CONVEYOR IDLER?"



Radically different from all other idlers, the Limberoller is a flexible steel cable suspended between two bearings . . . neoprene discs are molded to the cable . . . forming a single roll idler which turns on its own axis. This imparts a flexing action which is self-cleaning . . . prevents material buildup, a source of trouble with conventional idlers.



Supports the belt throughout its entire width . . . doesn't have the unsupported gaps left between the rolls like conventional idlers. Increases belt life 20% and more. Materials don't "bump along" from idler to idler, either.



Two bearings, instead of six. They are up out of the dirt zone, not hiding down under the belt. Joy has never replaced a single bearing due to normal failure. Heard enough? There's more . . . get the whole story from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

JOY . . . EQUIPMENT FOR ALL INDUSTRY

WSW L6831-160 **Write for free bulletin 160-26**

CONVEYORS • AIR AND GAS COMPRESSORS • FANS • BLOWERS • ROCK DRILLS • BLAST HOLE DRILLS
HOISTS • ELECTRIC PLUGS, RECEPTACLES AND POWER DISTRIBUTION SYSTEMS

San Juan

(*From page* 121)

Three 35-cu. yd. bins store the surplus aggregate and a 100,000-bbl. silo is used for bulk cement, which is trucked in from the Ideal plant at Portland, Colo.

A bucket elevator carries the aggregate from a receiving hopper up to a horizontal shuttle conveyor running along the open tops of the storage bins and the compartments of the plant aggregate bins. Controlled from ground level, the shuttle belt can thus distribute aggregate at any of six points.

Eight 5-cu. yd. Challenge truck-mixers are equipped with two-way radio, the Motorola master station being located at the batch plant.

Building and other activity in the Farmington area is expected to accelerate at a higher pace as soon as the Bureau of Reclamation's $760,000,000 Upper Colorado River Project gains momentum. West of Farmington, will rise the largest dam on the project, Glen Canyon, which will require material quantities greater than did Hoover Dam. East of Farmington, on the San Juan River, is the site of Navajo Dam, smaller than Glen Canyon but still of respectable proportions. It rises 370 ft. above its foundation and is 6,100 ft. long at its crest.

AGGREGATES FOR KANSAS TURNPIKE quarried with Brunner & Lay ROK-BITS.

Carbide Rok-Bits—cross, chisel, "X", cut-away, taper socket bodies—standard, J-7.50; 200; 400; 600 types—gauge sizes: 1¼" thru 6".

Distributor: Martin Tractor Company, Topeka, Kansas.

Alloy or carbon drill steel—hex, round, extension steel, adapters, etc.

Aggregate production for the Kansas Turnpike called for a 1,500,000 ton one season run. Wagon drills equipped principally with Brunner & Lay Rok-Bits® put 3½" blast holes down through the 20-ft. limestone ledge. Rok-Bits gave increased drilling speed, greater footage life, fewer bit changes and lowest cost per foot of hole drilled which all added up to lowest cost per ton of aggregate. Jobs that call for top production, call for Brunner & Lay Rok-Bits. Put their cost-cutting features to work for you. Write for new catalog #756.

Brunner & Lay Products

Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. • Brunner & Lay Rock Bit of Philadelphia, Inc., 2514 East Cumberland St., Philadelphia 25, Pa. • Brunner & Lay of Los Angeles, Inc., 2425 East 37th St., Los Angeles 58, Calif. • Brunner & Lay, Inc., 150 Leslie St., Dallas, Texas • Brunner & Lay Rock Bit of Asheville, Inc., Sweeten Creek Rd., Asheville, N. C. • Brunner & Lay of Portland, Inc., 600 N. Tillamook St., Portland 12, Ore. • Birmingham Rock Bit Co., Inc., 5-18th St., S. W., Birmingham, Ala. • Brunner & Lay, Inc., 2 Santa Fe Drive, Denver, Colo. • Brunner & Lay (Canada) Ltd., 6301 Cote de Liesse, Dorval Station, P. Q.

Bird & Son, Inc.

(*From page* 118)

which they are fired at the required temperature for permanently binding the coloring media. From the discharge end of the kiln, the hot granules are raised in a Chain Belt hot elevator to a hopper and chute from which they are fed into a cooler.

The latter, a 6- by 45-ft. Ruggles-Coles combined air and water spray type unit, reduces the temperature of the granules to the point where they can be hand-held. Discharged from the cooler as finished products, the granules are chuted to the boot of a 30-ft. Link-Belt bucket elevator and raised to a 60-ton storage tank. From this point, they are transferred to any of the finished granule storage bins in the adjacent roofing mill.

The interior of the granule plant is kept remarkably clean, particularly so in view of the fact that, of necessity, it completely houses a dry-processing operation which involves equipment typical of virtually all crushed stone operations. A Sly dust filter, equipped with a 30,000 c.f.m. fan, draws from the entire plant, and at all critical points, dust ducts have been installed. At regular intervals the concrete floor of the granule plant is sprinkled with compound and swept.

In addition, the dryer has an individual dust collector—an Eastern Engineering wet-cell unit. The dust collected in the Sly filter is fed to the mineral stabilizer tank, which holds the product of the ball mill. This material is transferred from the tank to the roofing mill in a Yeomans dust transporter.

The Southeastern manager in charge of the Charleston plant and sales in its territory is J. H. Van Hoy. William Freegard is plant superintendent, and Ernest Zinkowski, assistant superintendent, is in direct charge of the interesting and unusual granule operations.

The Wichita Falls (Tex.) Sand and Gravel Company has purchased the Bowie Readymix Concrete Co., Wichita Falls, which will be operated under the name of Bowie Transit Mix.

Walt Werner and Gene Musgrave of Fallon, Nev., have formed the Fallon Sand and Gravel Company. The firm will process sand and gravel.

"Eucs" STEP UP PRODUCTION...

Full length and width bottom door opening and wedge shape of body provides fast, clean dumping into the drive-over hopper at the plant. In just a few seconds the "Eucs" dump their loads and are on the way back to the pit.

...at new Quigley Plant of Ft. Worth Sand and Gravel Co.

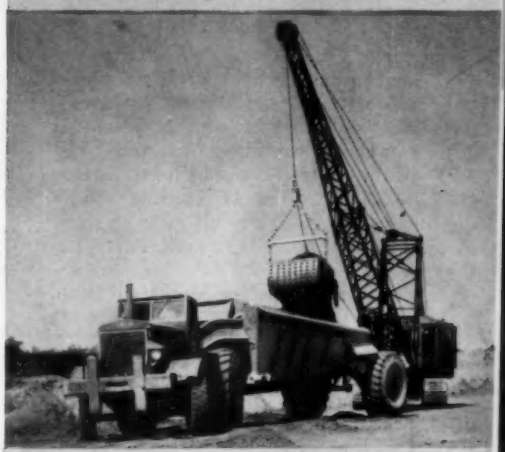
Powered by a 300 h.p. engine 10 speed transmission, the "Eucs" maintain fast travel speed on the well maintained haul roads. One-way hauls from pit to plant are up to 3 miles long.

Three Bottom-Dump Euclids of 17 yd. struck capacity are working 10 hours a day, five and one-half days per week, at the new Quigley plant of Ft. Worth Sand and Gravel Company. One of the most modern in the Southwest, it recently replaced the oldest and largest of the company's four plants.

A 2½ yd. dragline loads the "Eucs" with sand and up to 3 inch gravel for the 1½ to 3 mile haul from pit to plant. The Euclids dump their 22-ton loads into a drive-over hopper that feeds the classifier. Average hourly production is 255 tons.

Euclid equipment has reduced hauling costs on hundreds of mine, quarry and industrial operations. Have your Euclid dealer give you full details on the complete line of Rear-Dump and Bottom-Dump haulers for off-highway work, self-powered Scrapers and the TC-12 Crawler Tractor. He has facts and figures that show why owners everywhere have proved that ***Euclids are your best investment.***

EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio



Draglines with 2 yd. and 2½ yd. buckets and 60' booms load 22 tons of sand and gravel at the pit. The low, wide hopper of the "Eucs" makes an easy target for fast easy loading with minimum spillage.

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Shrinkage, Activity as functions of lime burning conditions

By JAMES A. MURRAY
Associate Professor of Materials
Massachusetts Institute of Technology

PART II

Volume Change of High-Calcium Limestones as a Function of Temperature

SIX samples of high-calcium limestones were studied in a manner similar to the calcite reported in Part I. (See PIT AND QUARRY, May, 1957, page 122.) The chemical analysis of the six high-calcium stones is given in Table 6.

Stone C-1 was subjected to 17 different burns in an atmosphere of carbon dioxide in order to determine whether the phenomenon previously noted with calcite—the fact that low porosities are associated with low heating rates—could be noted by this technique. The 17 burning conditions involved heating rates of from 5 to 25 deg. C. per minute. A careful study of all of the data indicates no particular trend of shrinkage with change of heating rate in the range of 5 to 20 deg. C. per minute. The few tests at rates of 25 deg. C. per minute show more shrinkage than those at 20 deg. C., and to this extent agree with the results obtained on the pure calcite. It should be pointed out, however, that the range in heating rates covered by this study with the heating microscope (5 to 25 deg. C. per minute, 9 to 45 deg. F. per minute) is less than that used by the two previous studies, 9 to 120 deg. F. and 6 to 95 deg. F., respectively. Since the higher rates of burning which are accompanied by the greater shrinkage of calcite are not feasible with the heating microscope, the problem of whether or not the rate of burning of commercial limestones affects the shrinkage must still be considered "not proved." Because the trend of shrinkage with rate of burning was obscure in all cases with the commercial limestones, the results at all rates in any atmosphere have been averaged and are reported as such.

The results for the six high-calcium stones are shown in Figures 7 to Figure 12, inclusive. In spite of the relatively similar chemical analyses shown in Table 6, there was a wide difference in the shrinkage behavior of the several stones.

Stones C-1 was qualitatively similar to calcite in that a much greater shrinkage occurred in the carbon dioxide atmosphere. Also, the specimens burned in nitrogen or air atmospheres showed expansion at all temperatures up to 1,400 deg. C.

Stone C-2 behaved in an entirely different manner. Not only was high shrinkage evident in all atmospheres, but this was also the only stone tested which showed a consistent difference in the shrinkage in a nitrogen and an air atmosphere. Furthermore, contrary to the behavior of calcite and of stone C-1, the shrinkage in the carbon dioxide atmosphere was much less than in nitrogen or air.

Stone C-4 presents another type of shrinkage. Here there was no appreciable difference in shrinkage in carbon dioxide or nitrogen. All specimens exhibited about the same degree of shrinkage.

Stone C-5 again is qualitatively

TABLE 6

Chemical Analyses of High-Calcium Limestones

Stone No.	C-1	C-2	C-4	C-5	C-7	C-8
Acid Insoluble	0.57%	0.45	0.33	0.31	0.39	0.13
SiO_2	0.65	0.39	0.40	0.19	0.44	0.15
Fe_2O_3	0.08	0.10	0.06	0.05	0.09	0.09
Al_2O_3	0.32	0.29	0.27	0.31	0.35	0.12
CaO	54.74	54.72	55.08	54.65	54.25	55.20
MgO	0.26	0.50	0.26	0.81	0.81	0.43
CO_2	43.42	43.56	43.58	43.69	43.38	43.77
H_2O & Organic	0.13	0.11	0.04	0.00	0.30	0.23

TABLE 7

Chemical Analysis of Dolomitic Limestones

Stone No.	D-1	D-2D	D-2W	D-2Y	D-3	D-4
Acid Insoluble	0.50	0.21	0.10	0.42	0.16	0.03
SiO_2	0.46	3.37	0.24	1.17	0.13	0.02
Fe_2O_3	0.16	0.44	0.23	0.39	0.22	0.10
Al_2O_3	0.31	1.05	0.27	0.55	0.88	0.33
CaO	30.70	28.98	30.23	29.93	29.99	30.25
MgO	22.02	20.76	21.82	21.53	21.60	21.65
CO_2	45.30	44.30	45.75	46.05	46.90	47.50
H_2O & Organic	0.42	0.80	0.50	0.35	0.38	0.03
Mols CaO	.548	.518	.540	.534	.536	.540
Mols MgO	.456	.515	.541	.534	.536	.537
Mol Ratio MgO/CaO	0.996	0.994	1.002	1.000	1.000	0.994

similar to calcite and to Stone C-1, but in this stone the samples burned in the nitrogen atmosphere showed some shrinkage at the higher temperatures.

Stones C-7 and C-8 reversed the behavior again, as the specimens burned in nitrogen in all cases (above 800 deg. C.) showed higher shrinkage than did those burned in carbon dioxide.

To summarize, six high-calcium limestones have been studied. A wide difference in the shrinkage of these stones has been found. In particular, the shrinkage in five of the six stones was markedly affected by the atmosphere surrounding the specimens during burning. Two of these stones had high shrinkage in a carbon dioxide atmosphere and low shrinkage or even expansion in a nitrogen atmosphere, whereas three had high shrinkage in nitrogen and low shrinkage in carbon dioxide. The stones were also subjected to chemical analysis, to petrographic studies, and to differential thermal analysis. No relation was found between the shrinkage as a function of atmosphere and either the chemical analysis or the petrographic characteristics. The stones having high shrinkage in nitrogen all had some irregularities in their differential thermal analysis curves, indicating possible reactions or inversions occuring at temperatures below the decomposition temperature of calcium carbonate.

Shrinkage of Dolomitic Limestones as a Function of Temperature

Dolomitic limestones from four commercial plants were obtained for study in this investigation. One of these samples, D-2, although from a single quarry, contained stone of three different colors, white, grey, and yellow. This stone was hand sorted into three fractions, D-2W, D-2G, and D-2Y, each of which was examined separately. There were therefore six dolomitic stones included in these tests.

The chemical analysis of each stone is given in Table 7. The variation in the impurity content of these dolomitic stones is greater than in the high-calcium stones studied. The molar ratio of MgO to CaO was very uniform, however, ranging from 0.994 to 1.002.

The shrinkage curves of one of the six dolomites are shown in Figure 13. All were very similar and differ appreciably from the curves for high-calcium stones. There was not a great deal of difference in the shrink-

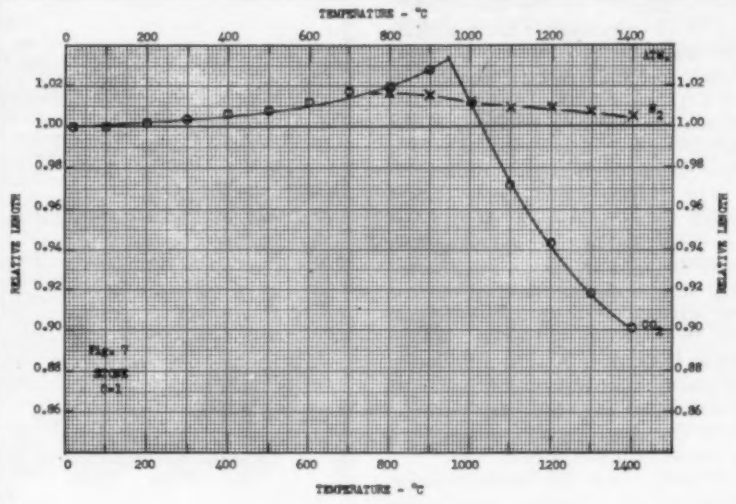


Figure 7

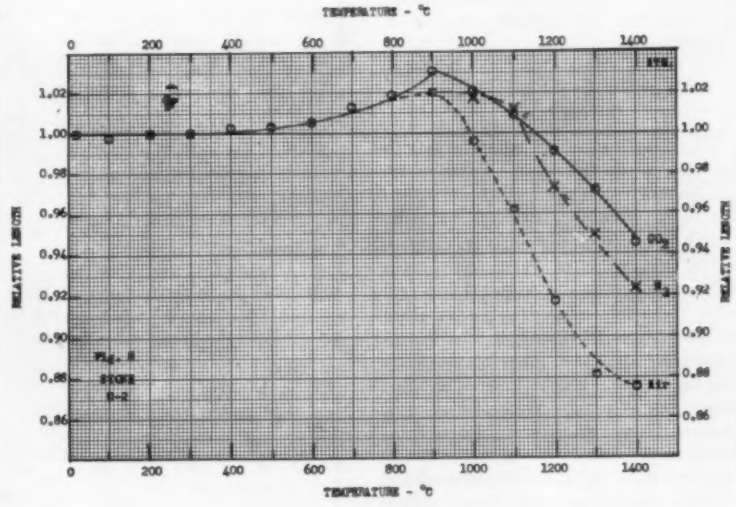


Figure 8

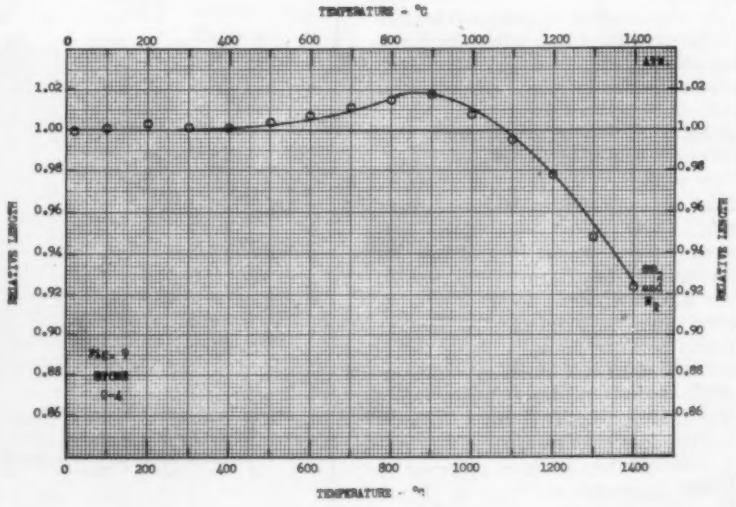


Figure 9

age as affected by the atmosphere, but in all cases slightly more shrinkage was obtained in the nitrogen atmosphere than in the carbon dioxide atmosphere. With the exception of stone D-2G, the magnitude of the shrinkage was much less than for most of the high-calcium stones.

The peculiarity of these curves which is outstanding is the appearance of a double maximum length in most cases. The curves are characterized by a slight expansion up to a temperature of about 700-800 deg. C., followed by a contraction to about 1,000 deg. C. This is followed by another expansion, continuing to about 1,200 deg. C., followed by a final shrinkage as the temperature increases to 1,400 deg. C.

There is no discernible relation between the chemical composition and the shrinkage. However, stone D-2G, which had the highest shrinkage, also had the highest amount of impurities.

Effect of Sodium Salts on Shrinkage

The question of whether or not to use salt in the burning of limestone has been a vexing one in the lime industry for years. Attempts to burn lime have been made with salt added to the fuel, with rock salt added with the stone feed to a rotary kiln, and with the stone soaked in a solution of salt prior to burning. Some extreme results have been claimed by the Japanese in regard to fuel savings when salt is used. Many lime companies have tried salt with their limestone. Some have been quite certain that it has been beneficial to the quality of the lime; others have been equally certain that no beneficial results have been attained.

It was decided to make a few tests of salt-treated stone, using the heating microscope. Two salts were used, sodium carbonate and sodium chloride. These were dissolved in water to form a 10 percent solution. The prepared cubes of stone were dried, then soaked in the solution of either Na_2CO_3 or NaCl for 16 hours, then dried again, after which the treated stones were burned in the heating microscope apparatus. The results are summarized in Table 8. In no case was a significant difference found between the salt-treated stones and the untreated stones at temperatures below 800 deg. C. Therefore the data are omitted from Table 8 for the lower temperatures.

The number of tests reported in Table 8 are not sufficient to permit firm conclusions, and yet certain trends are very evident. When an

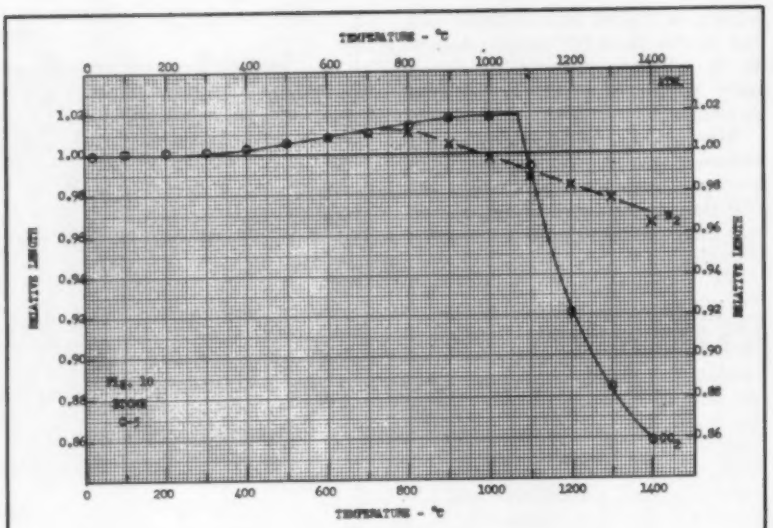


Figure 10

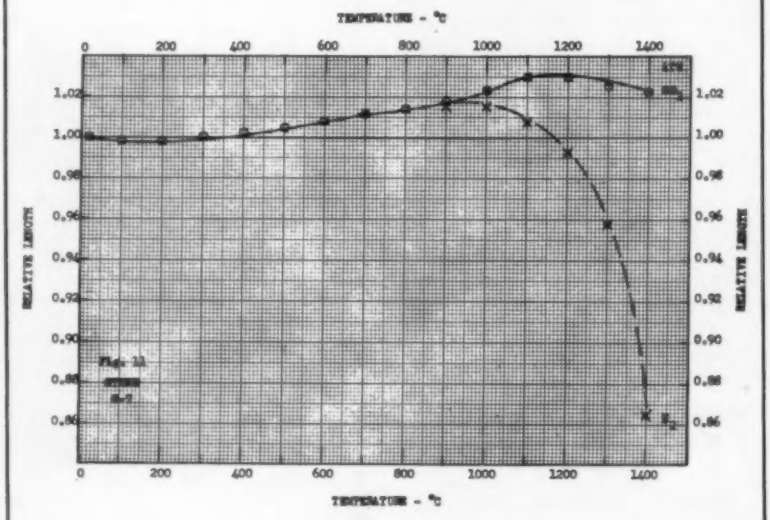


Figure 11

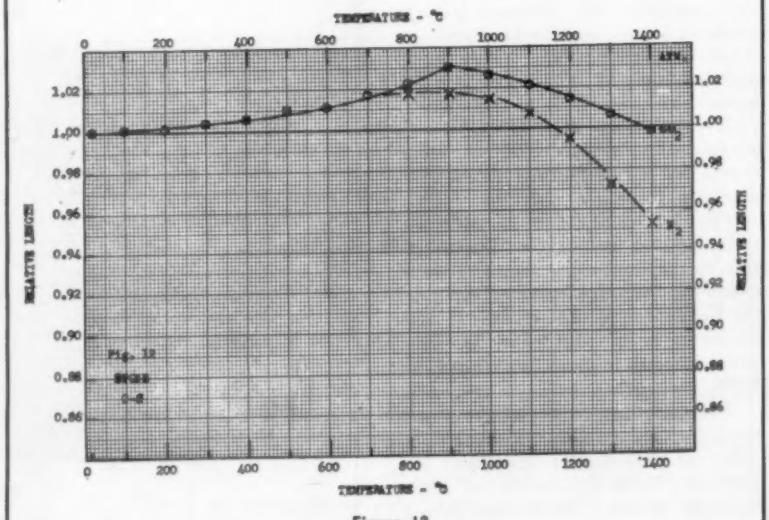
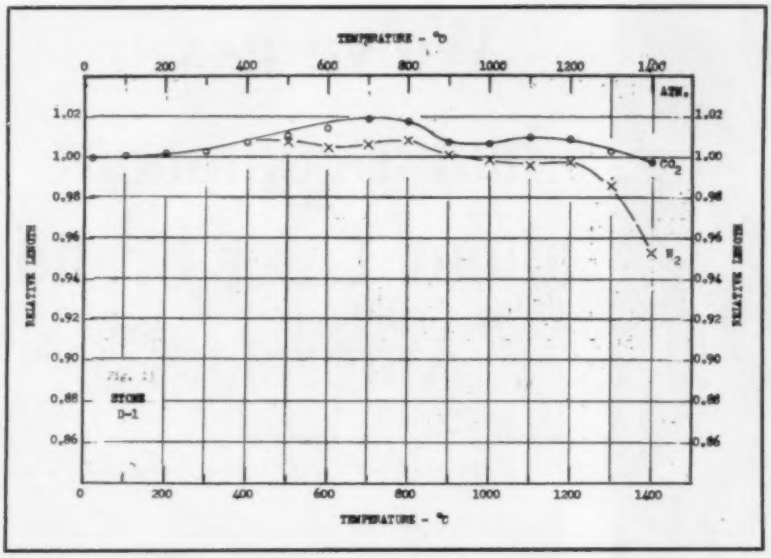


Figure 12



untreated limestone exhibits high shrinkage in either carbon dioxide or nitrogen, the addition of salt to this limestone appears to prevent shrinkage from taking place. When an untreated limestone undergoes little or no shrinkage in either carbon dioxide or nitrogen, the addition of salt to the stone has no appreciable effect on shrinkage.

The action of Na_2CO_3 and of NaCl was substantially the same. In three of the six cases where direct comparison of these two salts is possible, the Na_2CO_3-treated stones expanded slightly more than the NaCl-treated stones; in the other three cases, the reverse was true.

In no case was any substantial shrinkage produced through the burning of salt-treated limestone.

This result prompts a review of data previously reported and cited in part in Table 2. (See PIT AND QUARRY, May, 1957, p. 124.) These data are concerned with the shrinkage of 28 high-calcium limestones of known analysis as reported in the original publication. Some of the 28 stones were split into two or more fractions, based on the color or texture of the stone. This subdivision was made subsequent to the analysis of a composite sample of the original stone. Hence, it is possible that two samples in Table 2, designated with the same number and different literal suffixes (6A and 6B for example) may have had slightly different analysis from that reported for the sample in Table 1 of the original paper. The data on shrinkage of high-calcium limestones, reported in Table 2, have been grouped so that all stones having the same Na_2O content are placed together. The data for the several groups have been averaged with the results as given in Table 9.

These results are in remarkable agreement with those obtained by the entirely different method using the heating microscope. As the No_2O content increases, the shrinkage decreases. This trend may explain some of the irregularities hitherto observed. Determination of Na_2O are not normally made on limestones because of the low absolute amount present and the difficulty of the determination. It is not to be expected that all salts containing Na_2O will behave in an identical manner in affecting the shrinkage of limestone. A great deal of additional study is needed on this phenomenon.

Conclusions

The studies on the burning of limestones reported here have included many typical commercial high-calcium limestones and several dolomites, as well as pure calcite. The rates of burning and the retention times have been varied over a wide range, and the effect of a variety of atmospheres has been studied. Linear changes from stone at 20 deg. C. to lime at 1,400 deg. C. have been found to vary from an expansion of 2.3 percent to a shrinkage of 14.2 percent, corresponding to a volumetric expansion of 7.1 percent and a volumetric shrinkage of 37.7 percent.

TABLE 8

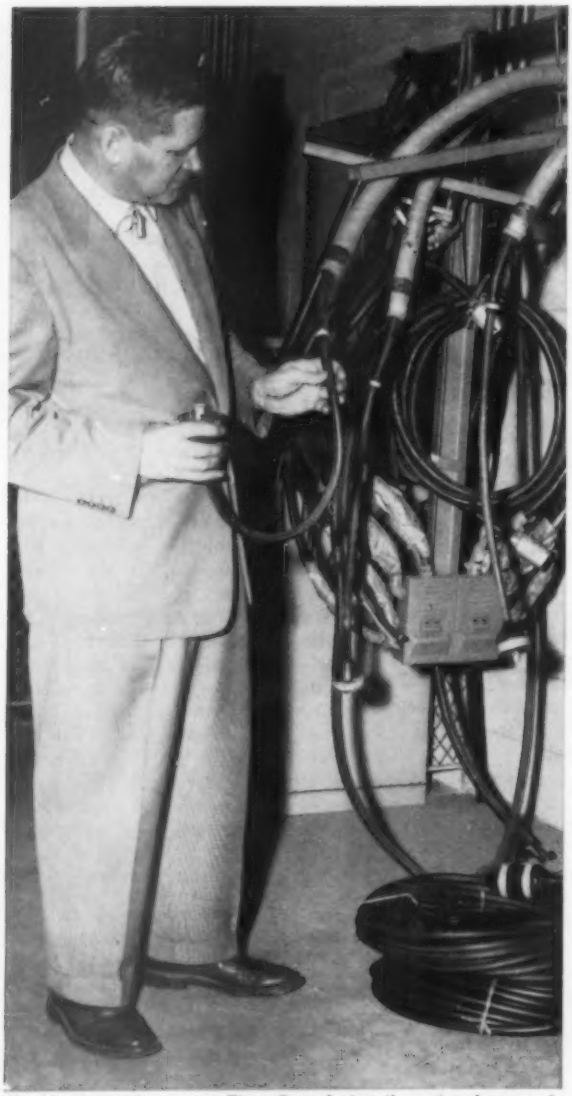
Effect of Sodium Salts on the Shrinkage of Limestones

Stone	Atm.	Solution	Orientation	Relative Length At 800°C.	1000°C.	1200°C.	1400°C.
Calcite	CO_2	-	Perp.	.992	.976	.930	.896
"	"	Na_2CO_3	"	1.000	1.008	1.013	1.016
"	"	NaCl	"	.997	.985	.986	.992
Calcite	N_2		Perp.	.983	.976	.978	.980
"	"	Na_2CO_3	"	.983	.967	.972	.973
"	"	NaCl	"	.995	.990	.991	.994
Calcite	CO_2	-	Par.	1.028	1.040	1.001	.952
"	"	Na_2CO_3	"	1.031	1.039	1.052	1.054
"	"	NaCl	"	1.024	1.020	1.026	1.027
Calcite	N_2	-	Par.	1.016	1.018	1.021	1.027
"	"	Na_2CO_3	"	1.024	1.019	1.026	1.027
"	"	NaCl	"	1.015	1.013	1.014	1.019
C-1	CO_2	-		1.020	1.011	.944	.900
C-1	"	Na_2CO_3		1.014	1.013	1.010	1.003
C-1	"	NaCl		1.024	1.022	1.020	1.020
C-1	N_2	-		1.016	1.011	1.009	1.005
C-1	"	Na_2CO_3		1.016	1.012	1.006	1.004
C-5	CO_2	-		1.014	1.007	.978	.923
"	"	Na_2CO_3		1.018	1.014	1.020	1.019
"	"	NaCl		1.015	1.019	1.010	.999
C-5	N_2	-		1.010	.997	.984	.965
"	"	Na_2CO_3		1.008	.998	.980	.955
C-7	CO_2	-		1.015	1.024	1.030	1.024
"	"	Na_2CO_3		1.003	1.016	1.020	1.017
D-1	N_2	-		1.008	.999	.996	.954
"	"	NaCl		1.011	1.014	1.022	1.011
D-20	N_2	-		1.013	.999	.978	.871
"	"	NaCl		1.012	1.013	1.018	.995

TABLE 9

Shrinkage and Na2O Content of High-Calcium Limestones

Na_2O Content	No. of Specimens in Ave.	Average Volumetric Shrinkage After 1 Hour At 1750°F.	2050°F.	2250°F.	2450°F.
0.000%	6	17.9%	31.4%	36.8%	43.8%
0.005	4	14.0	30.9	41.7	43.6
0.008	20	14.3	27.9	37.1	42.0
0.012	5	5.1	20.3	33.2	39.9
0.015	5	(+3.2)	5.2	16.7	26.8
0.024	3	(+2.8)	0.7	7.0	17.0



Mr. Maginniss inspects a Tiger Brand pigtail coming from end of a vibrator tool.

"We've never had a complaint about Tiger Brand Amerclad!"

says H. J. Maginniss, President
Maginniss Power Tool Company, Mansfield, Ohio

Here's a success story for you. In 1947, Mr. Maginniss started his company with one employee—himself. One year later, he added one more employee. Today, he has 35, and business is booming. His only product is an electric generator-vibrator system that knocks the entrapped air out of freshly poured concrete so that it is denser and stronger.

Early in the game, Mr. Maginniss learned that construction men did not exactly baby his tools. As a result, everything is built as ruggedly as possible, and that includes the cable, which is four-conductor, No. 12 AWG Tiger Brand Amerclad. Sometimes the cable drapes over several stories of scaffolding and is dragged over rough concrete, wooden beams and steel piling—while heavy trucks roll over it down on the ground. Despite all this, they have never had a complaint about the cable.

Do *you* need this kind of quality? Your AS&W salesman will give it to you!

Harry Bunton paints a vibrator. Notice heavy casing around cable near the hand hold.

Here is a cable casing that was damaged in use. Cable inside was not injured.

Workman ready to drop tool into concrete. Electric generator is on ground.

See the snarl of cable between tool and generator. Tiger Brand is made for this treatment.

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Some beliefs long held in the lime industry are not supported by these data. The term "hard-burned" is usually used in the industry for lime which has been inactivated and is less reactive with water. It has been generally assumed that burning at high temperatures, burning for long periods, and burning of stone with high impurity content facilitated hard-burning. When stones are burned for a constant *time* at a series of temperatures, those burned at the higher temperatures always shrink more (are more hard-burned) than those burned at the lower temperatures. This procedure corresponds with that used in the operation of shaft kilns and accounts for the belief that burning at high temperatures produces "hard-burned" lime.

When the lime is burned at a series of temperatures, not for a constant time but for a time only sufficent to produce complete calcination, a different behavior is encountered. Now there is little relation between shrinkage and temperature of burning, but there appears to be a relation between shrinkage and rate of burning. A rapid preheating of the stone to calcining temperatures produces lime which has shrunk much more than lime produced by a slow preheating. This procedure corresponds to some extent to the operation of a rotary kiln.

The effect of the atmosphere present in the kiln during and subsequent to the calcination of the limestone has been studied. It is clearly shown that calcite burned in an atmosphere of carbon dioxide shrinks much more than when it is burned in air or in nitrogen. Some high-calcium stones behave in a manner similar to calcite; others show lower shrinkage in an atmosphere of carbon dioxide than in air. This may account for discrepancies between laboratory studies and plant practice. Many laboratory studies have been conducted in electrically heated furnaces wherein the atmosphere is air.

In the lime plant, however, the lime is usually in direct contact with the gases of combustion of the fuel, containing appreciable amounts of carbon dioxide. It has been shown that a gas containing 25 percent carbon dioxide and 75 percent nitrogen produces substantially the same shrinkage as one containing 100 percent carbon dioxide. Therefore, discrepancies between laboratory studies of certain stones burned in air, and the behavior of these same stones burned under commercial practice may be accounted for. One of the high-calcium stones, and all four of the dolomites studied showed little or no difference in behavior as a function of atmosphere. In these cases, the results of conventional laboratory studies should agree with plant practice.

The effect of additions of small traces of sodium chloride or of sodium carbonate to limestone prior to burning has been to reduce the amount of shrinkage in several of the stones. In no case was there an increase in shrinkage caused by the addition of these salts. The same phenomenon may be noted in commercial high-calcium limestones to which no salt has been added but which inherently contain variable amounts of sodium salts; the stones with the larger content of sodium salts had less shrinkage than those free from the salts.

Hypothesis

The behavior of limestones during burning shows several peculiar phenomena, many of which, however, may be reconciled on the basis of the following hypothesis. Most high-calcium limestones contain traces of sodium salts, varying from 0.000 percent to 0.025 percent Na_2O. These salts may be NaCl, but this has not been demonstrated. The presence of the larger amounts of Na_2O results in a limestone which shows little or no shrinkage under the usual burning conditions.

It is possible that these small traces of Na_2O react with the CaO to form a three-dimensional structure which is resistant to shrinkage. This hypothetical reaction between two solids is necessarily of a rather slow rate. It is therefore possible, by using rapid rates of heating, to cause the limestone to behave as if this sodium content were not present and to undergo shrinkage characteristic of a stone free from sodium.

The influence of atmosphere on shrinkage may also be a characteristic of the presence or absence of this sodium compound or compounds. The type of atmosphere may have an appreciable influence on the stability, volatility, and reactivity of the unknown compound.

Finally, since most sodium salts have appreciable vapor pressures at lime burning temperatures, the porosity of the stone may produce a secondary effect, providing channels through which the sodium salt may vaporize before reacting with the lime. There is some evidence that porous stones shrink more than nonporous limestones.

The above hypothesis is restricted at present to high-calcium limestones. The available data on dolomites is insufficient to establish whether the same phenomenon occurs.

Acknowledgments

The author is responsible for the various conclusions and the hypothesis stated above. The experimental work on which these are based has been contributed by several former members of the staff at the Massachusetts Institute of Technology. In particular, Herman C. Fischer, former assistant professor, made valuable contributions, not only in the experimental work but also in many discussions of the theoretical aspects of lime burning. Many of the experiments were conducted by D. W. Sabean, L. S. Rolnick, and R. V. Pelaez.

Funds for the conduct of this work were supplied by the National Lime Association, Washington, D. C., over a period of several years. This sponsorship of research into the fundamental physical properties of lime is greatly appreciated.

Particular acknowledgment is due to the following members of the National Lime Association who privately contributed the funds necessary for the purchase of the heating microscope which has proved to be an extremely valuable tool in the study of the shrinkage during burning: the Gypsum, Lime and Alabastine Corporation of Canada, Toronto, Ont.; the New England Lime Co., Adams, Mass.; the Southern Cement Co., Birmingham, Ala.; and the Warner Company, Philadelphia.

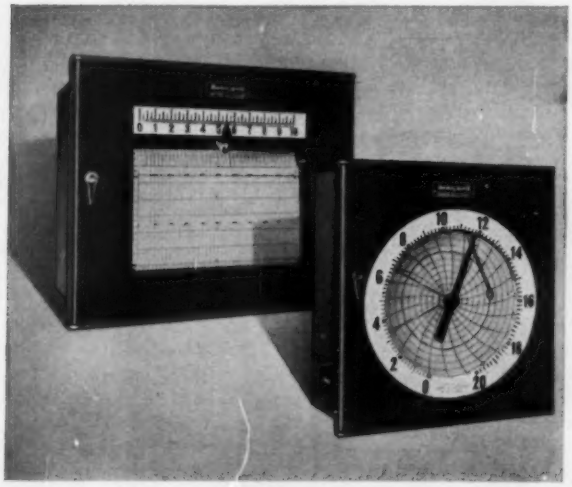
Bowaters (*From page* 99)

transported to a 54-ft. bucket elevator, both Rex Chain Belt units.

The bucket elevator discharges into a reburned lime tank from which the lime is transferred via variable-speed screw feeder and drag chain to the slaker. This closes the reburned lime circuit. Facilities have also been provided for the storage and handling of purchased fresh lime used in bleaching operations.

General contractor for construction of the entire facility was Fraser Brace & Roane-Anderson of New York. The Traylor Engineering and Manufacturing Company supplied the new kiln and its auxiliaries, while the causticizing and clarifying installations are Dorr-Oliver equipment.

Sir Eric V. Bowater, chairman of the parent company, is president of the Bowaters Southern firm. Key personnel at the mill include V. J. Sutton, general manager; D. W. Timmis, secretary; C. E. Opdyke, treasurer; and J. Dyer, sulphate superintendent, assisted by G. Jackson.



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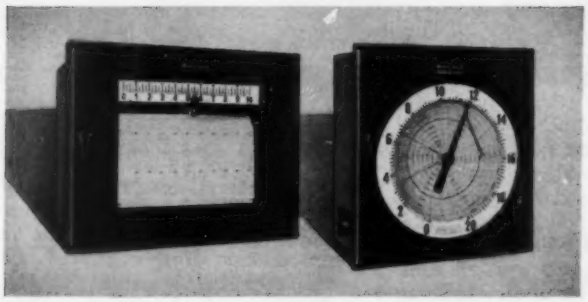

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Washington News Letter

(*From page* 12)

a small amount of tax, would probably discover that they owe no tax at all. For middle- and upper-income families it would involve very little savings. Nevertheless, this simple device would probably reduce the tax revenues of the Federal Government by almost $3,000,000,000 a year.

The next most popular device appears to be the proposal to cut all tax rates by a particular percentage —somewhere between 5 and 10 percent is generally suggested. The effect of this device would be just about the opposite of that achieved by a rise in exemptions. The largest benefit would go to the middle- and upper-income families, while the effect of the tax burden on the low-income families would be practically negligible.

It would, of course, be possible to combine these two plans; but the end result would be anything but simple. However, if and when some tax reductions occur, this more complex method, which will give everyone a little relief will probably be used.

Other methods for cutting the personal income tax have also been talked about, but these do not appear to have quite as much support. Among them are such suggestions as cutting the first bracket rate, which is now 20 percent, to some lower percentage figure. A plan pushed by the Democrats last year would give a flat tax cut of $20 for each taxpayer and each dependent. The latter would have about the same effect as the increase-in-exemptions plan.

There has been much less talk about cutting corporation taxes. Except for an extremist group, there are practically no members of Congress who are even considering the possibility of cutting the corporation tax by more than two percentage points, from its present level of 52 percent to a level of 50 percent. Even this slight cut seems a very remote possibility.

If all of this sounds as though there would not be much change in the situation this year, that seems to be just about right. Of course, there is no real political necessity for taking tax action this year because no important elections are scheduled. It is generally in election years that budgets rise, that taxes are cut, if only slightly, and deficits are overlooked.

Labor Developments

(*From page* 80)

that the proportion of nonproduction workers dropped again to approximately the level of the 1920's. Thereafter, during World War II much of the employment expansion was also in the ranks of the production workers, and as a result, the proportion of nonproduction workers fell to a level somewhat below that established in the 1920's.

In the post-war period, however, the situation appears to have changed. An upward trend in the proportion of nonproduction workers began in about 1947, and it has persisted through years of employment expansion, as well as in years of minor employment contraction. In manufacturing, over the last 10 years, the number of production workers increased about 3 percent, but the number of nonproduction workers had increased about 50 percent.

This increase in the proportion of nonproduction workers was widespread and pervasive. It took place in practically every manufacturing industry, although the extent of the trend varied in different industry groups. The number of production workers showed relatively large increases in chemicals, petroleum products, and transportation equipment and relatively small increases in leather, tobacco, and apparel. The industries with the highest proportion of nonproduction workers at the beginning of the period also showed the largest increases.

The trend of an increasing proportion of nonproduction workers reflects both industrial development during the last decade and also some change in attitudes on the part of employers. It can be associated with several factors. The first of these is the large investment expenditures both for new plant and equipment and for expanded research and development. This resulted in a direct increase in nonproduction workers such as engineers, scientists, and other technical workers, and also employees who were engaged on forced-account construction.

One of the outstanding developments of the post-war period has been the great expansion of industrial research and development activity. In a survey made in January, 1954, it was established that nearly 14,000 manufacturing firms were conducting research and development and that they employed on such work approximately 150,000 scientists and engineers, plus about 100,000 technicians such as draftsmen and laboratory assistants. Heavy investment in new plants and equipment in the post-war period not only required more nonproduction workers in connection with the management of these new facilities but also, by increasing the output per man-hour, proportionately reduced the requirement for production workers. The combination of these two trends necessarily resulted in an increase in the proportion of nonproduction workers.

Finally, company activities which received comparatively little emphasis only a short time ago have in recent years become commonplace in well-ordered plants. The emphasis on human relations has introduced or expanded such functions as employee counseling, safety education, credit unions, suggestion awards, retirement and supplementary unemployment benefit programs, grievance handling and the broad complex of labor relations. All of these activities have required the addition of factory personnel not directly engaged in production.

In addition, the systematization of management and production techniques has greatly increased record-keeping activities.

Nor is it likely that this trend toward increasing proportions of nonproduction workers has come to an end. There is nothing on the horizon which suggests that there will be any decline in research and development activity, increased capital expenditures, or the expansion of record-keeping and other overhead functions. In fact, the likelihood is that all of these forms of activity will increase. It is being predicted, therefore, that the rate of nonproduction worker growth will continue to rise for some years.

This is rapidly becoming an area of great concern to many businessmen who are discovering that their overhead costs are far above what they were taught to believe is normal for their kind of activity. The principal hope lies in the direction of better organization and improved techniques in the accomplishment of these overhead tasks, many of which are office functions. This accounts for the rapidly growing interest in ways and means for cutting office costs and in mechanical devices to accomplish this result.

M. K. THORNTON assumed his new duties as executive director of the Texas Agricultural Limestone Association on March 1 at his headquarters in Bryan, Tex.

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ALLIS-CHALMERS *Engineering in Action*

new plant ups production 500,000 tons annually for

Phil Stahl, plant superintendent, although young in years, is long on experience in construction and aggregate-production.

Canyon Rock Products

By HARRY F. UTLEY

ANOTHER ON THE SPOT REPORT

AGGREGATE production capacity of metropolitan Los Angeles, already the largest in the country, was increased by more than 500,000 tons annually when the new plant of Canyon Rock Products in Upland, Calif., went into full production on March 1, 1957.

The Canyon facility, designed to produce in excess of 300 t.p.h. of all grades of sand, gravel, and crushed material, is owned jointly by F. C. Horowitz and D. L. Godbey & Associates. Mr. Horowitz is the proprietor of Standard Ready Mix Concrete, with batch plants in Whittier and Mira Loma. The Godbey firm of Glendale, Calif., is headed by D. L., C. L., and William Godbey and Robert Loudon. This firm is engaged in general construction and also owns and operates a commercial ready-mix plant in La Habra. Combined capacity of the owners' ready-mix plants approaches 2,000 cu. yd. daily; much of the washed-aggregate output at the new Canyon plant is therefore utilized in these facilities.

The Upland plant was planned by Pioneer Engineering Works, Inc., working with the owners in adapting a continuous-flow, all-steel facility in a low-level design, to meet the demands of the market. Cook Bros. Construction Machinery Company, Los Angeles, erected the structures and installed the equipment.

The deposit is nearly devoid of clay, colloids, or other deleterious intrusions and is in good balance gradation-wise, running about 28 percent sand. A Northwest 80D shovel excavates and loads the 10-wheel rear-dump pit trucks which deliver *via* a short haul to a 90-cu. yd. reinforced-concrete receiving hopper reached by an earthen ramp. It is estimated that the haul will not exceed ¼ mi. during the first 5 years of operation.

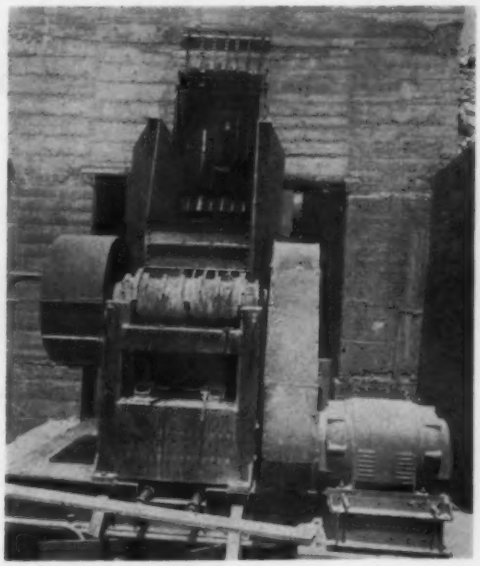
From the hopper, a Pioneer 48-in. by 14-ft. apron-feeder regulates the flow to a Pioneer 3042 jaw-crusher set to break at about 4½ in. A 30-by 160-ft. belt-conveyor inclined to a point 55 ft. above ground level at the head-pulley builds up a primary surge pile of about 8,000-ton capacity.

With plenty of ground area to spread the structural layout, owners of the new plant of Canyon Rock Products Company, Upland, Calif., were able to take advantage of low-level design and construction, as this panorama indicates. The raw surge pile is at the right.

With an assist from a bulldozer, the pile can supply the processing plant for 2 or 3 days of operation in the event of a stoppage in pit work. Reclamation from the pile is by way of a 30-in. by 160-ft. belt-conveyor operating in a tunnel beneath the stored material, the belt running up to the 4- by 24-ft. Pioneer tandem wet screen. This screen functions as two separate double- and triple-deck screens; but the setup is more compact, and greatly simplified the design of the supporting structure.

The tandem screen can make as many as six washed and sized products, including the plus 1½-in. oversize, which is scalped off and chuted to a Symons 4-ft. coarse-bowl cone-crusher at ground level. Tertiary reduction to yield a product finer than ¾ in. and including a high tonnage of readily-marketed "rock dust," is produced in a Symons 3-ft. Short Head cone-crusher closed-circuited with the "dry side" screens, where sizing is effected by a pair of 5- by 14-ft. Pioneer double-deck screens. The crushing-and-screening circuits are flexibly arranged, so that, by spouts and flop-gates, any conceivable size of natural and crushed material may be blended, either as washed concrete aggregate or as specification roadbase product.

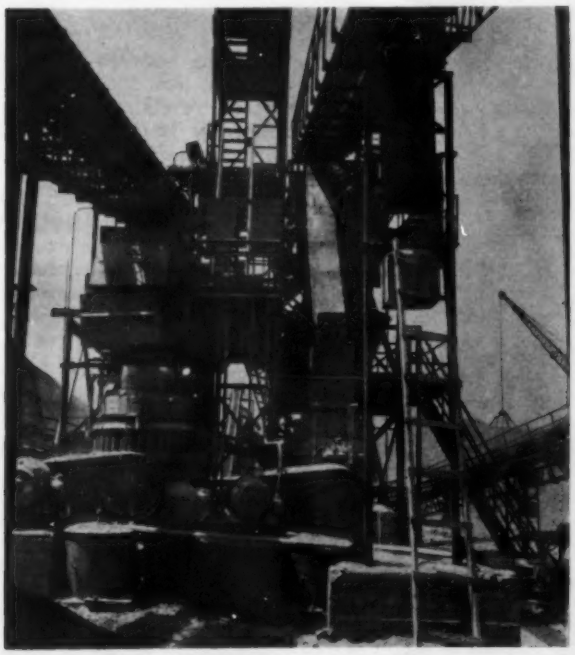
Minus No. 4 fines and the spent water passing the tandem screen are spouted to a 36-in. Eagle screw washer-dewaterer for processing as concrete sand. The sand is stockpiled by an inclined conveyor which transfers to a shuttle belt in a gallery to build an elongated, high-capacity storage and drainage pile. The coarse concrete aggregate (normally a blend of 1-in. top size used in the ready-mix plants) is stockpiled in line with the sand, both piles being over a 300-ft. concrete reclaiming tunnel.



The 30- by 42-in. primary jaw crusher is powered by a 125-hp. motor driving through multiple V-belting.

The recovery belt in the tunnel transfers to another belt-conveyor running 190 ft. up to the truck-loading bins. Two other washed and sized gravels, ¾-in. and pea (⅜-in.), are conveyed to a pair of 45-cu. yd. bins which load the trucks. Ultimately these sizes, too, will be ground-stored above the reclaiming tunnel. Roadbase products initially are ground-stored and loaded into trucks and trailers by a Koehring Cruiser crane swinging a 1-cu. yd. lightweight bucket. Future plans called for tunnel recovery and loading of this product also.

Conforming to a trend which originated in the industry in southern California, the aggregate-loading bins are located alongside the scale-house, the bin structure straddling a 70-ft. long scale platform. The scale is a Howe Weightograph. Thus the delivery units are loaded and weighed out simultaneously with a predetermined tonnage. The bin is compartmented, each of the five sections having a capacity of 50 tons. Turnhead, loading gates, and reclaiming gates in the tunnel are electrically-controlled and air-ram-operated by the scale operator.



The screening tower, with the wet side on the left and the dry side on the right. The two cone crushers are seen at ground level.

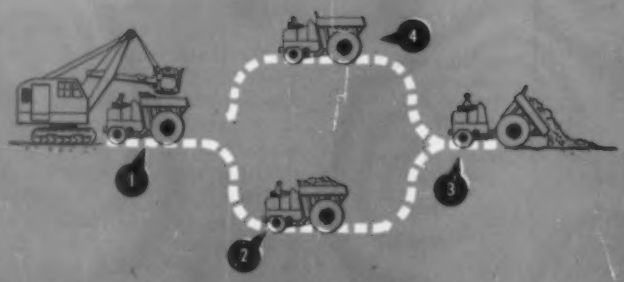
The numerous belt-conveyors used in the plant total about 2,000 ft. in center-to-center length, for which Quaker-Pioneer Reliance belting is used. Most of the motors are U. S. units, the largest being a 125-hp., 440-v. prime mover driving the jaw-crusher through multiple V-belting.

Water for requirements — about 450 g.p.m. — is obtained from the reservoir of the San Antonio Irrigation District about ½ mile west of the plant. The 8-in. pipeline is supplied by a Fairbanks-Morse turbine pump with a Fairbanks-Morse centrifugal pump for standby service.

(Continued on p. 156—More photos on p. 154)

On this Dumptor shuttle operation, it's an up-hill haul all the way from floor of pit to top of ramp. The other half of this big production team is a Koehring 1½-yard 605 shovel.

HOW TO *haul without turning*



1 Dumptor gets load, body forward, ready to travel.

2 Pulls away from shovel, body forward, ready to dump.

3 Dumps in one second, shuttles back for next load.

4 Returns to shovel in high gear, *all without turning.*

Shuttling between loading unit and dump area, Koehring 6-yard Dumptor travels round-trip *without turning.* It operates with equal ease in *both directions* along narrow haul roads, in tunnels, on overhead trestles — is especially practical for stockpiling, feeding crushers, loading cars. Dumptor gets this unique, no-turn advantage through a constant-mesh transmission that gives the same 3-speed travel in either direction.

Increases hourly output over 10%

By eliminating at least two slow turns on every trip, Dumptor cuts 30 seconds off normal cycle-time. This adds up to a substantial increase in yards or tons hauled per hour. For example — take a typical 1,000-foot haul where you are getting an average of 13.6 trips an hour with 2-turn operation. Even if Koehring Dumptor took the same time to load, haul, dump and return,

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its *no-turn* advantage would give you 15.4 trips. That adds up to an increase of 1.8 trips an hour on the same 1,000-foot haul.

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Gravity-dumping cuts another 15 to 25 seconds off cycle-time. There's no waiting for slow-acting body-hoists. Operator trips the release lever, and *gravity* dumps the 6-yard load in *one second*. Costs stay low, because with gravity-dump, there are no expensive hoist replacement parts, or hoist maintenance.

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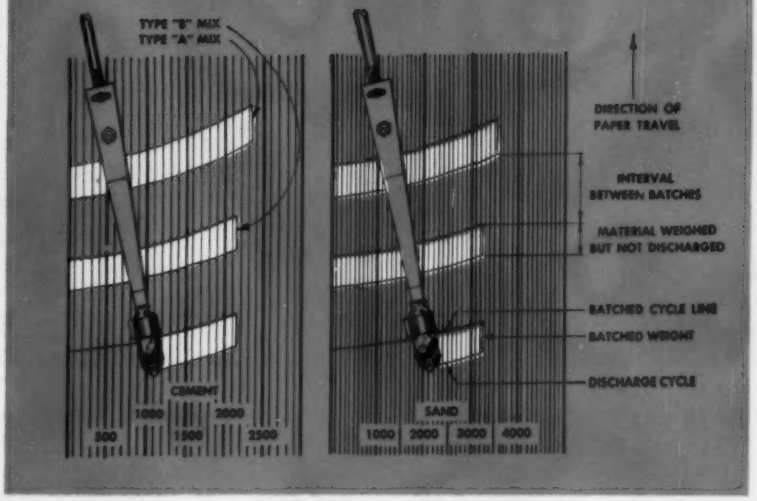
BE SURE OF

correct batch-weight *and record*

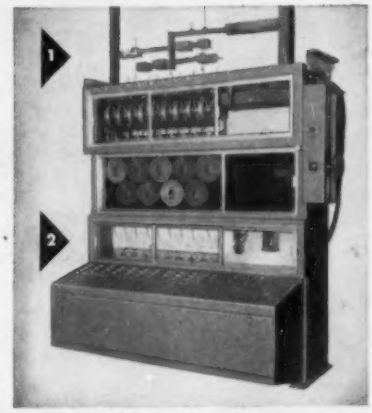


with Johnson graphic recording . . .

There is an increasing need in the ready-mixed concrete business for a complete record of every batch weighed out at the plant. With Johnson graphic pen-recording system, you're always *sure* of accurate batch-weight and record, because there's *direct transmission* of weight from each batcher to individual dial scale on the control cabinet.

ONE RECORD — All materials are recorded on one roll — no need to match 4, 5, or more charts to check a batch. Pens are carried on the ends of arms, rigidly attached to dial-unit pendulum shafts. Pen lines provide a quick way to check material batch-weights, show return-to-zero of each pen, and immediately indicate any material hang-up during charging or discharge. The line of the curve *tells at a glance* that all mixes are correct, as specified. Chart is printed on plain white paper, just before it passes the battery of pens. This eliminates any errors, where pre-printed paper might stretch or shrink.

TIME & DATE STAMP automatically records on the chart, the year, month, day, and time of day *to the nearest minute* each time a batch is discharged. No record is complete without this information. *A batch-sequence numbering stamp* positively identifies each batch on the chart for a *permanent record*. It can be re-set to zero each day. Read all about it in free 44-page catalog on "Johnson Concrete Plants". Ask Johnson distributor for your copy, or write us.



Johnson automatic Batch Controller (above) selects 7, 12, 120 different mixes for single material batchers and 60 mixes for multiple batchers — has repeater for re-batching.

1. Moisture-compensating beam shows dry weight on sand dial, can be used on fine aggregates, too. You just set up mixes for dry weight, and adjust compensator to the correct moisture percentage from time to time as required.

2. Note battery of recording pens with time and date stamp, and the batch-sequence stamp, which register a complete record *all on one chart*.

C. S. JOHNSON CO., CHAMPAIGN, ILL. • STOCKTON, CALIF.
Koehring Subsidiary

A9

CONCRETE PLANTS • BATCHERS • BINS • ELEVATORS • SILOS • BUCKETS

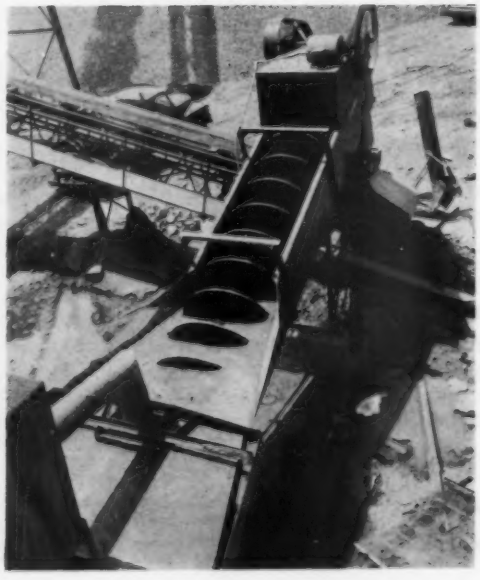
Left: Another view of the new Canyon Rock plant. Conveyor in foreground comes from primary crusher (right of picture) and builds an 8,000-ton surge storage pile.

Center, left: The chute-flopgate arrangement beneath the 4-ft. wide by 24-ft. long 2- and 3-deck tandem screen. Equipped with sprays, it washes and sizes all coarse aggregate. The control tower is high above.

Bottom, left: The delivery conveyor to the 5-compartment truck-loading bin alongside the scalehouse. Turnhead, bin, and tunnel-recovery gates are all controlled electronically from the scalehouse.

Bottom, right: All concrete sand is processed and dewatered by this 36-in. diameter spiral.

Shuttle and stacker belts can build up a large-capacity sand-storage stockpile.

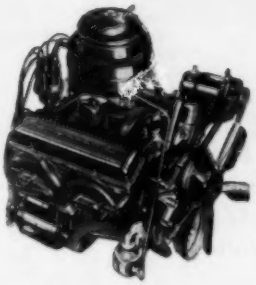


POWERFUL REASONS WHY A CHEVROLET STAYS ON THE JOB...SAVES ON THE JOB!

COMPACT CHEVY V8

(weighs up to 150 lbs. less than others)

- Shortest stroke of any truck V8
- Short, durable connecting rods
- Vertically compact cylinder block
- Rugged yet light crankshaft
- Efficient hydraulic valve lifters
- Long-wearing Moraine bearings



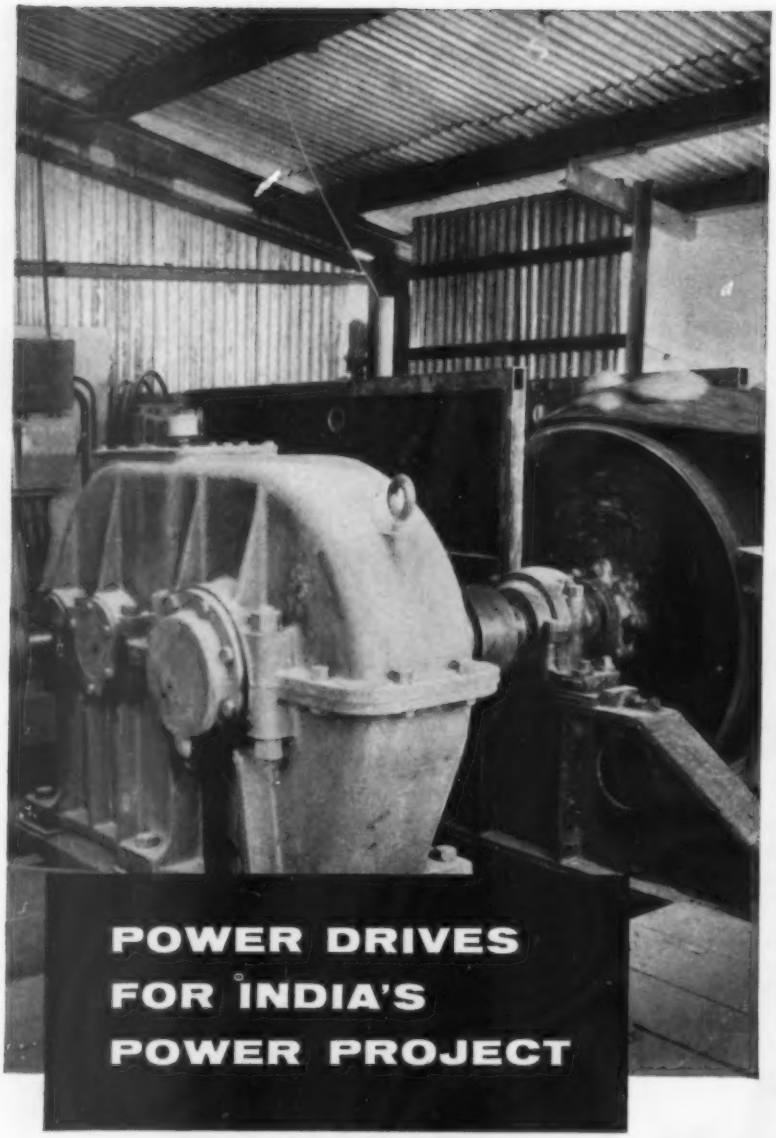
Chevrolet trucks are powered by V8's that make every ounce count. Because of their trimmed-down design, they use less power to haul their own weight and put more power into hustling your cargoes. Like all Chevrolet truck components, these engines are efficient performers—and that means top economy and dependability!

Chevy's the dollar saver *de luxe* of the American road, and many of the reasons why can be found beneath the Chevrolet truck hood. That's where you'll often find a great V8 that's at the head of its class for compact, *efficient* short-stroke design. You won't find features to equal all those listed here (at left) in any other truck V8's today. Or, if you prefer a 6, Chevy's got the most popular 6-cylinder powerplants in the history of hauling. They're honest-to-goodness *truck* engines, specially built to *stay* and *save* on rough, tough hauling jobs.

You'll find that a Chevrolet truck gives you *so much* to save with! Your Chevrolet dealer is waiting to fill you in on all the facts. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

Biggest sellers . . . because they're biggest savers! CHEVROLET

CHEVROLET TASK·FORCE 57 TRUCKS



India is harnessing the mighty Sutlej River with the $125 million Bhakra Dam to provide power and irrigation for the Punjab area. Twenty-five Jones Herringbone Speed Reducers drive 51 Hewitt-Robins belt conveyor units used to carry aggregate over three miles of extremely rugged terrain and two miles through processing operations.

Jones Power Drives were specified because their quality construction assured continuous operation. To find out how Hewitt-Robins products and services can help you, consult your classified telephone directory for the nearest Hewitt-Robins representative, or contact Hewitt-Robins, Stamford, Conn.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE . . . VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

Phil Stahl, plant superintendent, joined the organization in the autumn of 1956, when plant construction began. He has had wide experience in construction and aggregate-production and was last encountered by the writer when he visited the Bureau of Reclamation's Canyon Ferry Dam, in Montana, four or five years ago. Here Mr. Stahl was in charge of the plant which produced the aggregates for the dam. C. W. Bucknum is sales manager of Canyon Rock Products.

An open house was held by the management on May 3 to present the new production facilities to scores of persons affiliated with the construction industry in southern California.

Dr. E. Hognestad

Dr. E. Hognestad Appointed To Marquette Cement Staff

Dr. E. Hognestad has been appointed technical director of Marquette Cement Manufacturing Company. He was formerly manager of the Structural Development Section of the Portland Cement Association and is an internationally recognized authority on structural uses of concrete. In his new position he succeeds C. E. Wuerpel, Marquette vice-president, who now assumes general administrative duties with the company.

Dr. Hognestad, a native of Norway, was graduated from Norway's Institute of Technology. He came to this country in 1947 and soon thereafter was appointed to the staff of the University of Illinois in the School of Theoretical and Applied Mechanics.

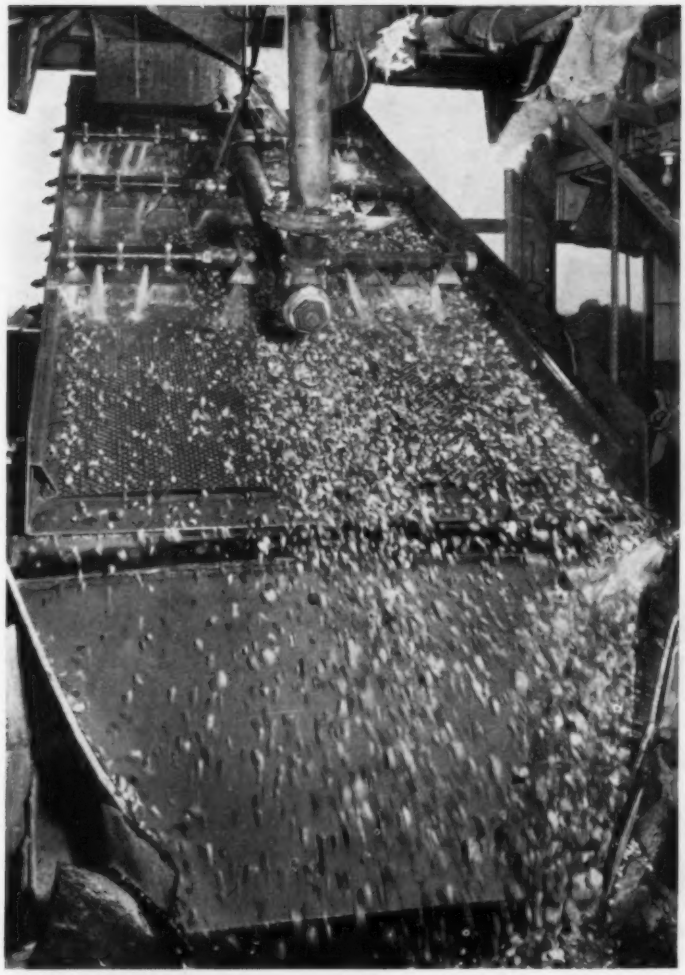
Dr. Hognestad received the 1955 A.S.C.E. award for his work in research on structural concrete.

Want high-speed separation? Low-cost operation?

Size it with CA

Concentric Action

Vibrating Screens



IDEAL SIZING-WASHING COMBINATION. This sand and gravel plant uses Link-Belt non-clogging spray nozzles in combination with a triple-deck "CA" screen. Fast tumbling action exposes every particle for uniform rinsing.

Lively LINK-BELT screen stratifies beds fast—gives every particle maximum sizing opportunity

In the powerful Link-Belt vibrator shown above, you see the key to the fast, accurate, unfailing separation delivered by Link-Belt "Concentric Action" vibrating screens. Mounted in a unitized, extremely rigid deck assembly, this two-bearing vibrator is completely enclosed . . . incorporates unbalanced weights that are adjustable to the amplitude offering best balanced of speed and effectiveness. Frictionless labyrinth seals lock out dirt and abrasive dust from the vibrator housing . . . save maintenance troubles.

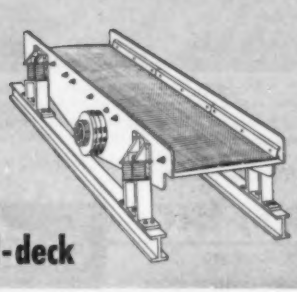
Designed specifically for medium- to heavy-duty screening needs, Link-Belt "CA" screens are fully described in Book 2554. Your Link-Belt office can furnish a copy, or write direct if you prefer.

LINK-BELT

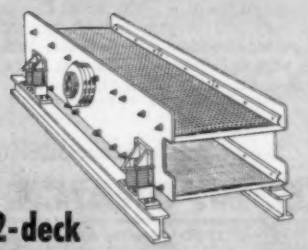
VIBRATING SCREENS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.536

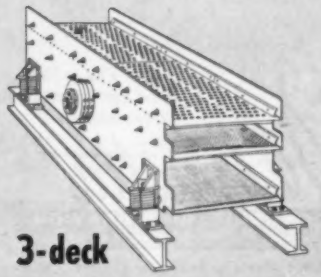
Choice of screen decks permits up to 3 simultaneous separations



1-deck



2-deck



3-deck

The RIGHT Answer to Your BULK STORAGE Needs:

MARIETTA CONCRETE SILOS

For efficient, low cost storage and handling of sand, gravel, stone or cement, have a MARIETTA storage system engineered to your particular operation.

Marietta silos are economically erected in any desired capacity . . . any number of units. Interlocking concrete stave construction provides safe, dry storage . . . resists wind, shock or fire . . . requires a minimum of maintenance.

Conveyors, feeders, discharge systems or other auxiliary equipment for your particular material handling requirements can be mounted on the sturdy walls of a Marietta silo.

Depend on Marietta's 41 years of experience to design and erect the most efficient storage system for your need under one cost-saving contract. No delays due to critical material shortages with a Marietta installation . . . erection is quickly and efficiently handled by factory trained personnel.

Write for Marietta's Modern Industrial Storage Systems Booklet and the right answer to your bulk storage problems.

THE Marietta CONCRETE CORPORATION Marietta, Ohio

41 Years Know-How in Pre-Cast Concrete Construction

BRANCH OFFICES: Baltimore 21, Md., Charlotte 6, N.C., Nashville, Tenn., Jamestown, N.Y.

Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

In an interesting letter from an official of a large contracting corporation, the writer inquired whether an employer is obligated to pay compensation to employees injured while going to and from their work or jobs. He also wanted to know the unusual circumstances under which employees are "within the scope of their employment" when injured and whether under the same circumstances of an injury the employee can recover damages from his employer.

A few weeks ago a higher court rendered an important decision to the effect that an employee is within the scope of his employment and entitled to compensation for an injury received when going to his work in an automobile.

For example, in *Charles H. Stanford, Inc., v. Gregory,* 303 Pac. (2d) 1112, the testimony showed facts, as follows: A man named Gregory, a sheet rock worker, was under the direction and supervision of the contractor who had employed him as a sheet rock worker. The ordinary procedure was to finish a house or a group of houses and wait until another house or houses were ready to finish. Gregory had his own transportation which consisted of an automobile, pulling a two wheel trailer, on which he carried his tools and a stove. He testified that he used the stove to heat the houses and that it kept the materials used in the sheet rock process from freezing. After finishing his work one day he started to drive back to his home. A tire on the trailer blew out, and while repairing the tire, he sustained an accidential injury.

The higher court held that Gregory was entitled to receive compensation under the State Workmen's

Onan ELECTRIC PLANTS

ELECTRIC PLANT NEWS

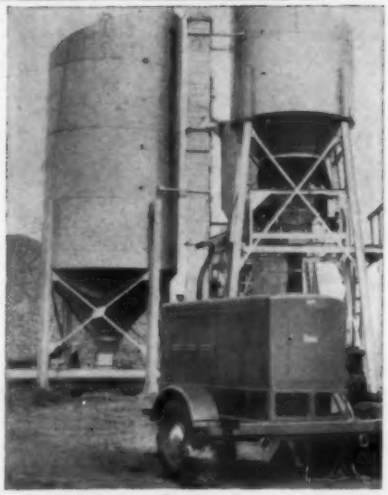
Onan ELECTRIC PLANTS

On-site cement plant operates with Onan power

35KW Onan Electric Plant powers 15 H.P., 5 H.P. and two 2 H.P. motors, vibrator, controls, welder and lights

It's a completely electrified operation . . . even to electric lights in the mobile office nearby . . . yet this bulk cement plant is far distant from the utility highline. The Onan heavy-duty, water-cooled electric plant runs continuously during working hours with a minimum of servicing. It has the capacity to provide electricity for miscellaneous lights, tools, motors and communications, too.

Other A.C. models: 500 to 75,000 watts. Also D.C. and battery charging units.



Series 35ED Onan Plant, powered by 8-cylinder gasoline engine, provides all the electricity needed. Trailer mounted, it is easily moved from site to site. Weatherproof housing.

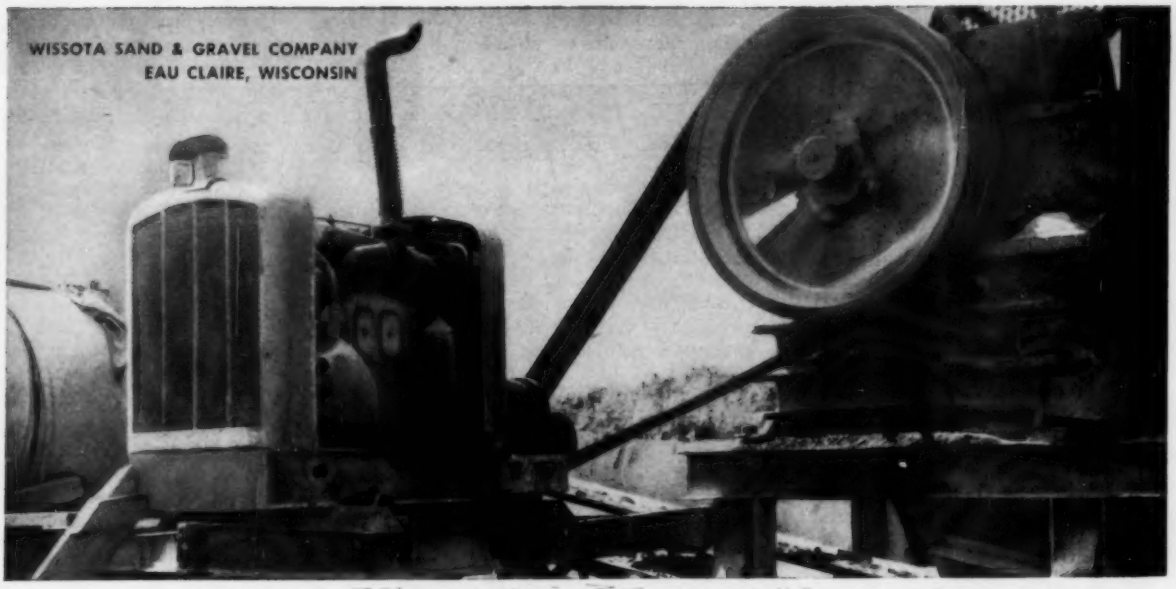
See your Onan distributor or write for literature

D. W. ONAN & SONS, INC.

3769 University Ave. S.E., Minneapolis 14, Minnesota

ELECTRIC PLANTS • AIR-COOLED ENGINES • KAB KOOLER • GENERATORS

Onan ELECTRIC PLANTS



OVERHAULS BE DAMMED!

Wissota's using Cities Service lubricants

Overhaul? What's that?

Wissota Sand and Gravel is too busy supplying aggregates for dams and highways to tolerate downtime . . . and they don't have to!

Take the G.M. diesel above. Since 1948, it has run without major overhaul . . . and none is anticipated. It operates on Cities Service C-300 Motor Oil.

Or consider Wissota's UD 24 International. So far, it has logged six years with nothing but a new set of rings, installed after 4500 hours. Again, thanks to Cities Service C-300 Motor Oil.

And don't overlook the diesel-driven locomotive crane . . . the one that's gone seven years with nothing but an adjustment of its injectors . . . and moved an estimated 2,000,000 tons of material. Score another for Cities Service C-300 Motor Oil.

"Actually, we've enjoyed similar performance from our seven washing plants and all 58 pieces of mechanized equipment, since we switched to Cities Service," says Treasurer Ray Larson.

"This, in the face of a yearly production that runs around 750,000 tons! All our Cities Service products—C-300 Motor Oil, Trojan MP Gear Oil, and No. 2 Diesel Fuel—keep us running trouble-free."

Like Wissota, you can expect big things from Cities Service fuels and lubricants. Get the facts, without obligation, from a nearby Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Where Lubrication Counts! "We get terrific bearing life since we switched to Cities Service," says Treasurer Ray Larson.

One of 7 Washing Plants of Wissota Sand & Gravel. With the aid of Cities Service lubrication, they turn out 750,000 tons of aggregates a year!

Equipment Galore! 40 trucks, 14 cranes and shovels, and 4 bulldozers. After 7 yrs. using Cities Service C-300 Oil, one shovel needs no overhaul!

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Compensation Act because the testimony showed that Gregory was paid by his employer for the time he consumed while going to and from his work. The higher court said:

"There is competent evidence reasonably tending to support the finding that claimant (Gregory) was to be paid for the time consumed in traveling to and from his home and that, therefore, the accidental injury arose out of and in the course of the employment."

For comparison, see *Oklahoma Company v. Santino,* 12 Pac. (2d) 221. This court said:

"The question is whether an injury arose out of and in the course of employment is one of fact to be determined by the Industrial Commission under the circumstances of each particular case."

Other higher courts have consistently held that an employee always may recover compensation for an injury sustained while he was "acting within the scope of the employment" whether or not the employer was negligent. On the other hand, no employee is entitled to recover "damages" from his employer unless the testimony shows that the injury resulted from negligence of the employer. Also, all higher courts agree that an employee who sustains an injury within the scope of his employment may recover compensation under the State Workmen's Compensation Act, although the injury resulted from the employee's own negligence. Here are several higher court decisions which illustrate when an employee is "within the scope of his employment" and entitled to compensation for an injury.

Robertson v. Olson, 181 Minn. 240, the employee was injured while riding in his employer's motor truck. In *Elliason v. Western,* 202 N.W. 485, the injured employee was returning to his employer's place of business in a truck furnished by the employer. *Schmitt v. American,* 42 S.W. (2d) 969: Here it was the duty of an employee to leave his home early and perform services for his employer at a job before reporting to the employer's place of business. The accident happened while the employee was traveling from his home to the job. *Auer,* 103 N. J. Law 372: The employee was authorized by the employer to use his own automobile, and his employer paid for the upkeep and running expenses of his car. *Wilson* 132 A. 611: Here an employee was shot by a robber while working for his employer. *White,* 137 N.E. 624: The workman temporarily left his work and was injured while going to get a drink of water.

In all the above cases the higher court held the injured employees entitled to receive compensation under the State Workmen's Compensation Act, but that none of the employees could sue and recover "damages" from the employer.

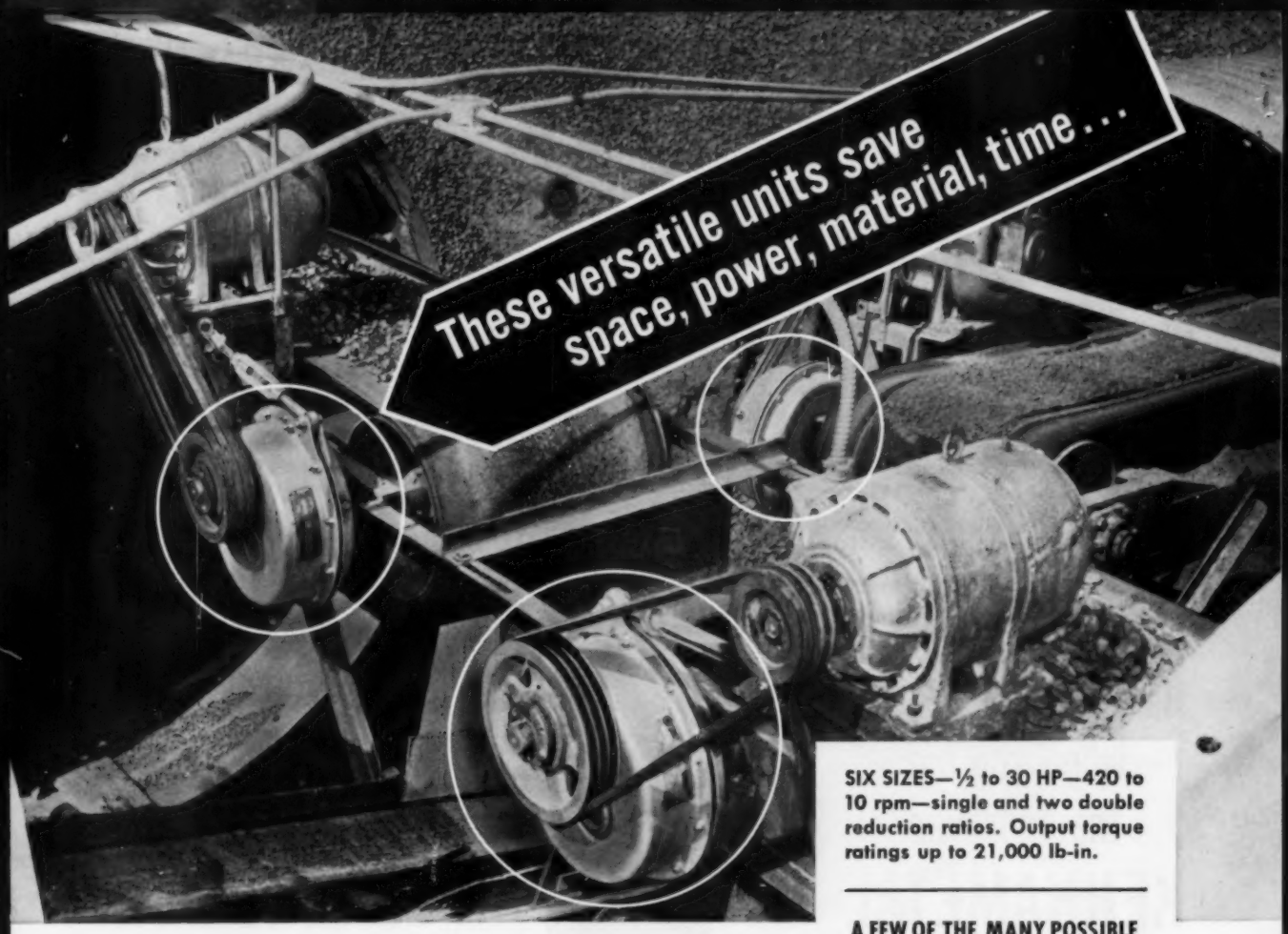
Original Intentions

A reader asked this question: "Is a written contract enforceable by the contracting parties, if the contract contains an error?"

Recently a higher court held that a written contract is void if it does not express the original intentions of the contracting parties.

For example, in *Asphalt Paving Company v. Githens,* 271 S.W. (2nd) 374, the testimony showed that a company's official signed a written contract with a general contractor to furnish concrete for runways of a municipal airport. The company delivered 1,289.91 tons of asphalt concrete to the contractor and, according to the written contract, $4,656.90 for the concrete was still due.

SHAKE
unloading
problems
New EASTERN
CAR SHAKERS
Bulk materials shipped in hopper bottoms and other open top railroad cars are unloaded easily with the aid of EASTERN'S new Car Shaker. Utilizing both impact and vibration, this new product incorporates the best features of earlier models to produce a more efficient operation. Its practical design and rugged construction have made it simple to operate and economical to use.
Write for Bulletin 55
EASTERN
CONSTRUCTORS, INC.
Poland, Ohio



SIX SIZES—½ to 30 HP—420 to 10 rpm—single and two double reduction ratios. Output torque ratings up to 21,000 lb-in.

FALK ALL-STEEL Shaft Mounted Drives

The photograph above typifies the way FALK Shaft Mounted Drives furnish the economical solution to problems of efficient speed reduction in a limited space. Within their rated capacities, these versatile reducers are designed to drive any machine and to fit any space requirement.

FALK Shaft Mounted Drives mount on the driven shafts and are connected by V-belt or chain to any convenient rotating power source. Unlimited choice of output speeds between 420 and 10 rpm is made possible by varying the ratio of driving sheaves or sprockets.

These units, with precision-cut gears of highest efficiency, use a minimum of power. They need no adjustable motor bases or slide rails; thus they save material. And, because they are readily available and easily installed or moved, they save time. Best of all, they are backed by FALK's unmatched experience in precision-gear manufacture.

Promptly available from factory and distributor stocks, from *coast to coast*. Ask your Falk Representative or Distributor for details—or write us for **Bulletin 7101.**

THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

Representatives and Distributors in Most Principal Cities

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- Motoreducers
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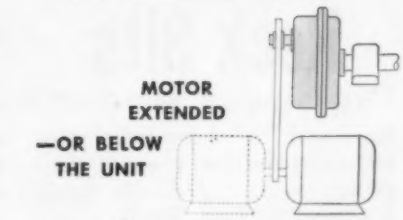
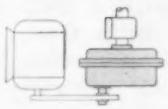
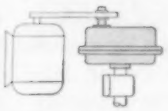
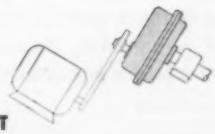
- Steel Castings
- Weldments
- Contract Machining

A FEW OF THE MANY POSSIBLE DRIVING ARRANGEMENTS









FALK

...a good name in industry

In later suit the contractor alleged that there was a mistake in the contract and that the agreed price was not $10 per ton as provided in the contract, but $1 per square yard.

The higher court held that since the testimony proved that the company originally intended to deliver the concrete to the contractor at $1 per square yard, the latter need not pay the company $4,656.90. The court said:

"Under the evidence in this case the undisputed evidence is that the contract originally made was to be $1 per square yard for asphalt pavement furnished. The written contract was a different one from that intended by the parties. It recited that defendant (contractor) was to pay $10 per ton."

This court explained further that a contract is not enforceable when it fails to express the intentions in the minds of the parties when it was signed. Moreover, courts freely exercise the power to correct mistakes in contracts when the proof leaves no doubt that the real intentions of the parties were something else.

Therefore, it is apparent that a written contract is not valid and enforceable if the testimony indicates that the obligations therein were not originally intended by the contracting parties.

Here is what you get when you use the improved KENNAMETAL* STYLE PX Rock Bits

Kennametal Style PX Rock Bits are available in sizes from 2½" to 5" diameter.

Improved "X" design eliminates rifling, provides greater chip clearance and promotes faster penetration. Alternate long and short carbide insert design puts the carbide where it is needed most, and also speeds penetration. Two off center water ports improve the removal of cuttings.

Longer bit life in service is provided by three new design features: First, these bits generally have more carbide than other bits of equal size. Second, the long inserts are segmented for greater strength. Third, all inserts are of special grades of carbide that were developed specifically for percussion drilling.

This new design eliminates the center spacer, a common source of trouble in drilling operations.

Investigate these bits for your drilling problems. A Kennametal representative will help you select the size and grade of Kennametal Rock Bits for each of your operations. Call him or write KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

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C-3046B

INDUSTRY AND KENNAMETAL ...Partners in Progress

Deed Broadly Construed

A reader asked this question: "Is a deed construed strictly in accordance with the plain meaning of the written words used in it?"

The answer is yes, if the original intentions of the contracting parties are not violated.

For illustration, in *Ozark Black Marble Company v. Stephenson,* 186 S.W. (2d) 145, it was shown that a property owner gave a "stone deed" to the Ozark Black Marble Company. The latter company agreed to pay the property owner $100 per acre for all land "used" in quarrying. The company spent about $4,000 in testing, sawing, polishing samples, surveying, and promotional work. Notwithstanding these expenses, the company did not succeed in selling the marble at a profit, and litigation developed over payments to the land owner for only a small area of the land used.

The higher court held that the company must pay the land owner $100 for each acre on which any work was done.

In this case the written original contract or deed plainly stated that the marble company would pay the property owner $100 per acre for all land "used," and no testimony was given that a prior verbal agreement differed from the agreement. Hence the property owner was entitled to only $100 per acre for the land actually used by the company.

Liability for Tax Payments

Another reader asked this question: "Recently the state sued me to collect taxes. Several years ago I started my brother in the sand and gravel business and advanced the necessary capital. Now, the state claims I am liable for payment of taxes against the business. Is this so?"

The answer to this question depends on the answer to another question: Did you control your brother and the sand and gravel business? If so, you are liable for payment of the taxes. On the other hand, if your brother had control of the employees and operated the business according to his own ideas, the brother is liable for payment of these overdue taxes. In other words, the courts hold that one who "controls" a business is the "employer," and therefore liable for payment of taxes.

For illustration, in *State v. Dean,* 188 Pac. (2d) 355, the testimony showed facts, as follows: One Dean permitted the use of his credit rating to assist his relatives in organizing and opening a quarry. An auditor for the state made an audit of the

One of three Barber-Greene Loaders owned by Laverne R. Falk of St. Ansgar, Iowa.

L. R. Falk, Iowa contractor, writes:

"Why I bought my third Barber-Greene Loader"

"We usually load a seven-ton spreader-truck in two minutes . . . handle 1500 tons in a ten-hour day. Our repair costs have been almost nil. Recently, we added a third Barber-Greene to the job.

"Our ag-lime piles are often damp, and in the winter covered with a thick frozen crust. When this material is dumped into a truck—say, three fourths of a yard at a time—it packs and is tough to remove. But our Barber-Greene Loaders pulverize lumps and crust . . . fill the truck in a loose, continuous stream that doesn't pack or clog.

"Simple operation lets our truck drivers and most of our customers' drivers easily operate our Barber-Greenes themselves."

Mr. Falk's report is typical of the 543's outstanding performance everywhere. This versatile loader moves from job to job at 15 m.p.h. . . . handles any bulk material including coal or snow . . . its hydraulically controlled swivel discharge conveyor saves valuable truck time. For loading from pits and banks and screening or scalping, Barber-Greene builds the crawler-mounted 82A. Barber-Greene Bucket Loaders are the lowest-cost method of truck-loading from stockpiles.

56-11-BL

Write for literature on this cost-cutting loader

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

books of the business, and prepared reports. Dean signed these reports because of the absence of the relatives.

The state sued Dean to recover payments of various taxes among which were taxes under the State's Unemployment Act. The state contended that Dean was the real owner and employer of the business and that his relatives were mere employees.

The evidence tended to place Dean in the position as owner of the business because the two reports prepared by the auditor of the state were signed by Dean.

Under these circumstances the higher court held that Dean was liable for payment of overdue taxes.

Injury Compensation Laws

All courts agree that the purpose of the State Workmen's Compensation Act is to provide injured employees with funds to subsist on until they can return to profitable work. Hence, a majority of courts hold that an employee who earns more money after an injury than before the injury cannot expect payment of compensation under the State Workmen's Compensation Act.

For example, in *Boulanger v. Liberty Mutual Insurance Company*, 31 So. (2d) 888, it was shown that, while attending to his regular work, one Roger suffered injury which necessitated the amputation of an arm. Four months after the accident Roger applied for compensation under the State Workmen's Compensation Act. The employer contested the suit and proved these facts: Before his injury Roger earned approximately $2,500 per year. His earnings since the accident averaged $3,002 per year.

Since Roger's income was more after the accident than before, the higher court refused to award compensation for the loss of his arm. This court said:

"In the present case the record abundantly shows, beyond any doubt, that Roger is capable of carrying on substantially and efficiently his duties and is performing his work in a satisfactory manner."

On the other hand, there are records of other higher court decisions in various states where such employees who earn more wages after an injury may still receive compensation under specific provisions of the State Workmen's Compensation Act.

Did You Receive a Letter?

Considerable discussion has arisen from time to time over the legal question: If a purchaser of materials denies that he received a letter, can he win a suit based on the contents of the letter?

Modern higher courts consistently hold that if the addressee of a letter denies that he received the letter and it was not returned to the writer, it is presumed that the addressee received it provided the writer proves that he properly addressed the envelope, placed the required postage on the envelope, and deposited it in a post office or government mail box. This law is applicable in all suits involving receipt of letters.

For example, in *Adams v. Plaza Inc.*, 43 S.E. (2d) 47, it was shown that one Adams purchased certain real property which he leased to a tenant. The lease stated that unless written notice of an intention to terminate the lease is given by the landlord to the tenant at least 90 days before its termination, the lease would renew itself. The tenant held over after termination of the lease although the landlord notified him to vacate. The tenant refused to surrender possession to the owner, claiming that he never received any notice that the lease would be terminated.

The landlord filed suit to compel the tenant to vacate the premises, claiming that more than six months before the expiration of the lease he

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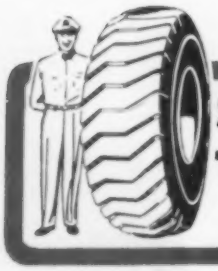

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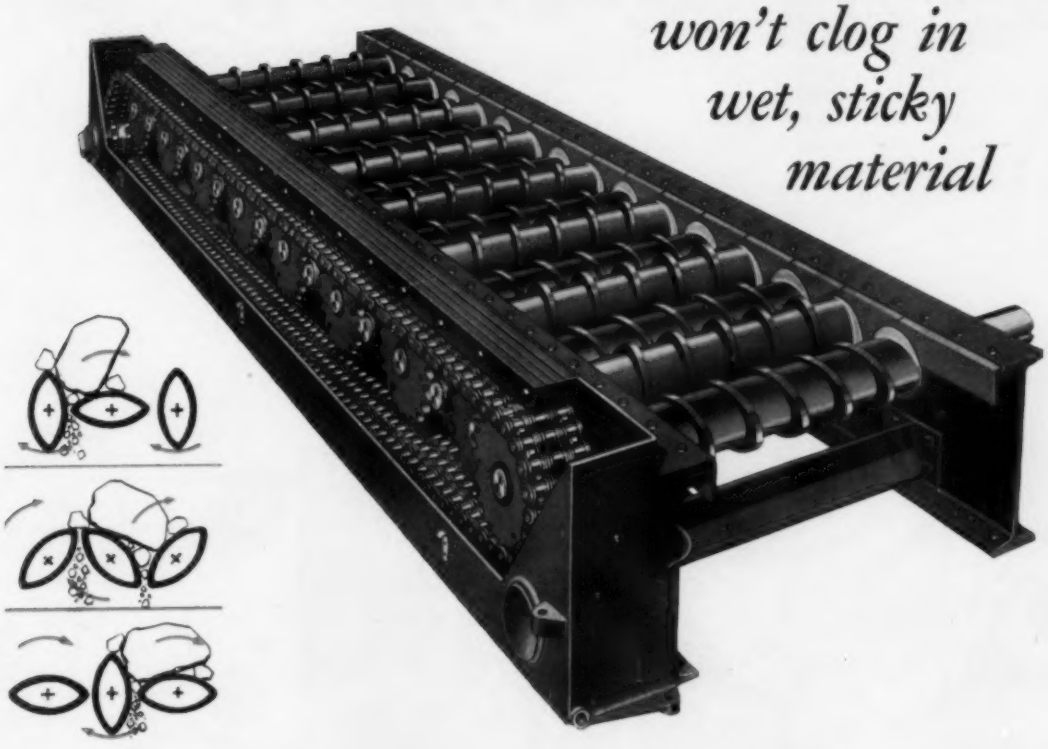
FEEDS AND SCALPS IN ONE OPERATION

won't clog in wet, sticky material



Elliptical-shaped bars form the bed of a hopper and are set in alternate vertical and horizontal positions. Turning of the bars imparts a rocking, tumbling forward motion to the load. Fines drop through spacing between bars. Oversize is delivered off the end.

The Wobbler Feeder increases crusher capacity by removing fines ahead of the crusher. Unlike a screen, the Wobbler does not vibrate — nor clog in wet, sticky material.

This combination feeder-scalper is needed in every mining operation. Here are a few uses now being made:

IRON ORE— The Wobbler is used as a portable machine to follow a shovel in reclaiming scattered ore stockpiles. Unwanted material is separated at the pile . . . usable ore is then trucked economically to mills and concentrating plants.

BAUXITE—A large number of Wobbler Feeders are being used by one of the Aluminum companies to separate fines from oversize in this gummy material — no clogging.

SLAG—The use of a Wobbler Feeder in place of a bar grizzly has cut grizzly maintenance from two days a week to four hours a month.

LIMESTONE— The Wobbler is removing 94% of fines ½-inch and under in the cement industry — for increased hammermill capacity.

Universal's Wobbler Feeder . . . . the profit machine for aggregate producers and road builders. Available in combination with Universal portable crushing plants. Discuss with your Universal distributor.

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had written a letter to the tenant stating that the lease will not be renewed at its expiration. The tenant denied that this letter had ever been received by him.

The landlord testified unequivocally that he typed the letter himself and mailed it in the post office. He further testified that he placed his return address on the envelope and that the letter had never been returned.

The jury decided that the tenant had not received the letter and, therefore, that the lease was automatically renewed. However, the higher court reversed the verdict saying that the law presumes that the addressee of a properly posted and addressed letter received it.

Therefore, the outcome of this late and leading higher court decision clearly establishes the law as follows: If the sender of a letter proves that he deposited it in a United States post office or regulation mail box, the law presumes that at this instant the addressee received the letter. If the sender cannot by direct evidence or testimony prove the exact time he deposited the letter in the United States post office or regulation United States mail box, the jury will listen to the testimony and decide whether or not the letter in controversy was so mailed.

A review of leading higher court decisions discloses peculiar laws in this respect. For illustration, the law presumes that the addressee of a letter received it the instant the sender deposited it in a United States post office or regulation mail box. Recently, for example, a buyer in California ordered a quantity of special quarried stone from a seller in Ohio. The seller in Ohio accepted the order by depositing a letter in a United States post office at 5 p.m., January 15, 1956. At 4:45 the same day the purchaser sent a telegram canceling the order. Since the telegram was not delivered until after the seller deposited the accepting letter in the United States post office, the higher court held that a valid contract was completed.

Also, it is important to know that the Federal law states that when the writer of a letter on which the postage is prepaid properly addresses the letter and has printed on the outside of the envelope his name and address, and the letter remains uncalled for at the office to which it is addressed, the postmaster shall return the letter to the writer without additional charge for postage. If the writer has written on the envelope the date the undelivered letter shall be returned to him, the postmaster must return it to the writer according to these instructions. If the writer fails to specify when the undelivered letter shall be returned to him, then, under these circumstances, the postmaster may use his own good judgment on what date he shall return the letter to the writer.

Contractor Breached Contract

A reader asked this question: "If a contractor stops work on a job can he recover any payment for the work he performed, and materials he supplied?"

Recently a higher court held that if a subcontractor breaches his contract with a general contractor, the subcontractor can recover payment for work and materials actually furnished up to the date he breached the contract.

For example, in *Nickel v. Pollia*, 179 Fed. (2d) 160, it was shown that a subcontractor signed a subcontract with a general contractor to furnish certain labor and materials on a project. The subcontract was cancelled by the general contractor, because the subcontractor breached the contract.

The higher court held that the subcontractor was entitled to recover the "reasonable value" of the services

let's face it!

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Sherman Equipment "On-the-Job" While Other Machines Stand Idle

The Contractor: The Webster Company, St. Paul, Minn.

The Job: Install an automatic lawn sprinkler system for a new school.

The Problem: Heavy rains which threatened to prevent completion of the job on schedule. Trenching machines clogged up and track-type dozers tore up the rough graded area.

The Solution: A lightweight Sherman back-hoe for the trenching with the ability to push itself along the ground with its dipstick. For backfilling and backgrading, the Sherman AJ 25 Loader on the dependable Fordson Major Tractor is used. Because of its mounting and leverage design, it transfers more weight to the big driving wheels of the tractor with resulting traction advantage. Easy steering is assured by the Sherman Power Steering unit.

Actually, the Webster Company has found its Sherman equipment profitable even on a rental basis where operators can be expected to give a rig all the abuse it will stand. Rugged, heavy-duty construction is a prominent feature of all Sherman Power Diggers, Loaders, Fork Lifts and other equipment. See them in action soon at your local Ford Tractor Dealer or write for Bulletin No. 4660.

*Manufactured for Sherman Products, Inc., by Johnson Hydraulic Equipment Company, Minneapolis, Minnesota

†Designed, Engineered and Manufactured jointly by Sherman Products, Inc., Royal Oak, Michigan. Wain-Roy Corporation, Hubbardston, Mass.

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SHERMAN MAJOR DIGGER-LOADER COMBINATION performs a great many different jobs for the city of Dearborn, Michigan. The unit is used to dig water main taps and sewer sections, to install fire hydrants, to load and backfill and to do many miscellaneous jobs.

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GUARANTEED REBUILT—FREIGHT PREPAID
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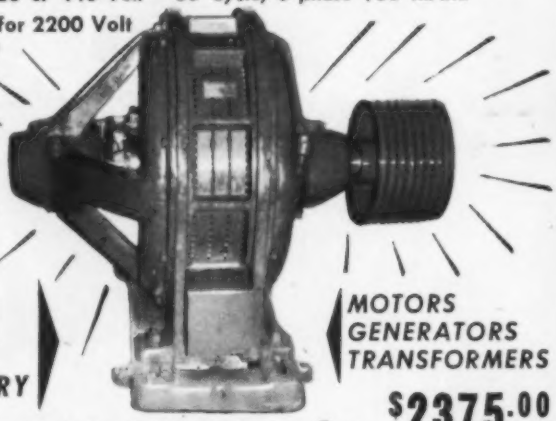

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rendered and material furnished up to the date of the breach. The court said:

"Having breached his contract, Pollia (subcontractor) could recover only the reasonable value of the services rendered and of the material furnished."

Seller Liable for Injuries

Recently a higher court rendered an unusual decision to the effect that the seller of a business is liable in damages for injuries to persons who come onto the premises, until the deed from the seller to the buyer is recorded.

In the late case of *Galleher v. City of Wichita,* 296 Pac. (2d) 1062, it was shown that certain property owners, referred by the court as "Cooper," sold their interest in a gravel pit to a city. After the sale contract was signed, but before the deed was recorded, a five year old boy drowned in the pit.

In subsequent litigation the higher court refused to hold the city liable but indicated that Galleher was solely liable. The court said:

"Cooper owned the premises upon which the sand pit existed on the date of Lonny Eugene's death. This being true, can defendant city be held liable under the attractive nuisance doctrine? We think not."

Kennedy-Van Saun Firm Observes Founder's Birthday

Approximately 500 Kennedy-Van Saun Manufacturing and Engineering Corporation employees, members of the Kennedy family, friends, and business associates gathered recently at Danville, Pa., at a dinner honoring the 94th birthday of Joseph E. Kennedy, K.-V.S. founder, inventor, and board chairman.

The celebration, one of the largest of these annual affairs, was attended by guests from six states and three countries. Fred O. Reedy, president of the company, presented a portrait of Mr. Kennedy to his family. Mr. Kennedy spoke very briefly about his first business ventures, when at the age of 22 he patented his inventions.

Effective April 1, the Universal Atlas Cement Company, New York, N. Y., increased the price of bulk cement by 15 cents a barrel at two of its plants in the eastern part of the country. The increase brings the cost of a barrel of regular portland cement to $4.35 from $3.20 at Universal's Hudson, N. Y., and Northampton, Pa., mills. Similar increases have been announced by other cement producers in the eastern states.

TYPICAL WORK BULL PACKAGES include the 42-hp Pit Bull (left) which is equipped with a ⅞-yd. loader. By utilizing low, direct-thrust loading principle and fast, no-stop-to-shift reversing clutches and torque converter — it frequently outperforms larger, more expensive shovel loaders. Work Bull (center) which is positioning compressor is 34-hp Model 202. Work Bull (right) is 52-hp Model 404 with hydraulically controlled ¾-yd. loader.

Work Bulls pay off

on digging or handling operations

. . . as primary equipment

Work Bulls give both large and small pit, quarry, sand and gravel or mining operators a great new opportunity to put former hand labor, or work too small for their present equipment, on a paying power basis. Work Bulls also pay off on small, scattered work-and-run assignments. And they'll earn their keep off-season, too. You can use them or lease them out for snow removal, scores of other money-making jobs.

. . . as backup machines

Team Work Bulls with bigger, more expensive, single-purpose rigs. You get the exact power/equipment cost ratio the job demands. And you increase equipment scheduling efficiency . . . cut down on overhead. What's more, Work Bulls travel anywhere without expensive trailers or special travel permits. Thus, it's highly practical to shoot them from site to site as your production picture changes.

...as utility or cleanup tools

When you're using shovels to clean up spill in the loading area, big graders to smooth haulroads, crawler dozers to haul wagons or skid light and medium-weight machinery — there's a profitable place for Work Bulls on your job. Low in initial price, hourly cost and upkeep — Work Bulls provide a perfect means to efficiently handle a wide range of cleanup and utility jobs.

Work Bulls have a profitable place on every project. Check to see which of the 5 tractors (34 to 52 hp) and 20 easily interchangeable attachments you need. Write for free 24-pg. catalog and the name of your Work Bull distributor.

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Division of Massey-Harris-Ferguson, Inc.

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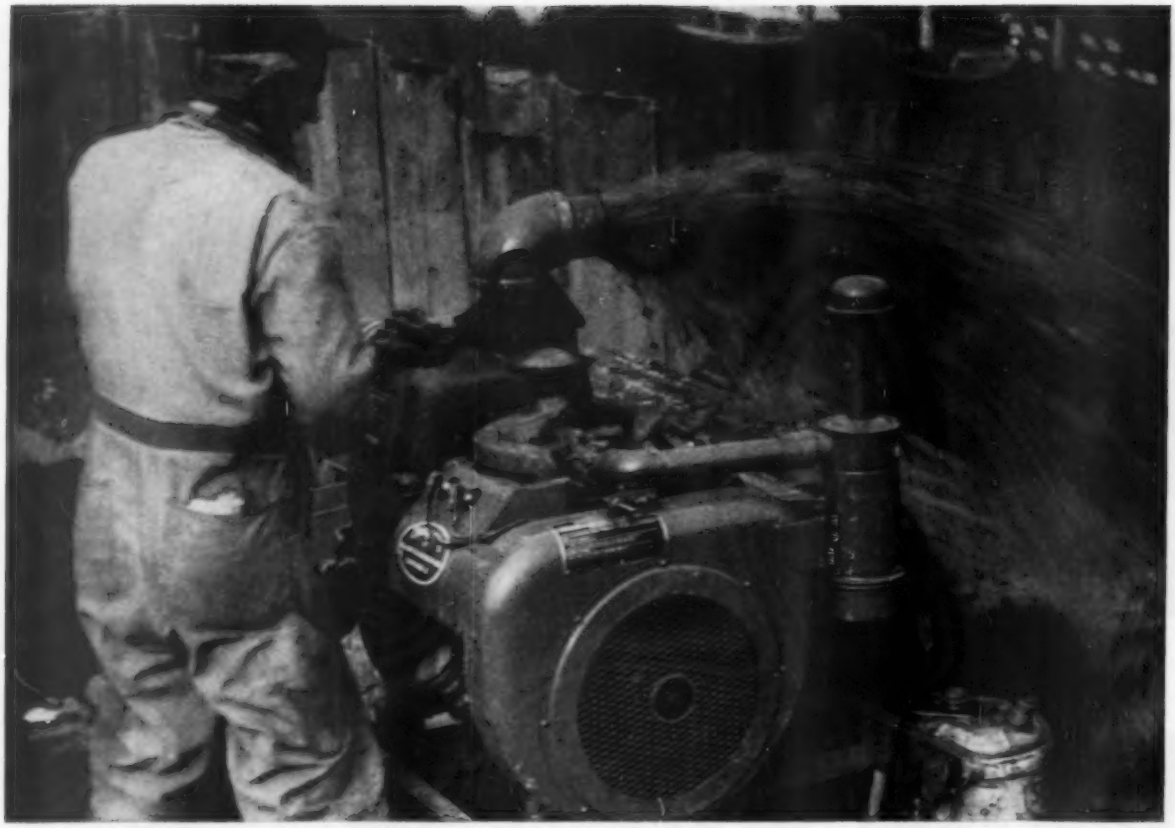


Gorman-Rupp Pumps keep this hot job moving!

The Horvitz Company, under a $2½ million contract, is building a ten-span bridge over the historic Ohio Canal and Cuyahoga River near Cleveland. The job, which includes two other bridges and river relocation, opens up a direct connection between heavily traveled Routes 8 and 21.

Constant seepage from the canal is always a threat for Mike Sekela, supervisor for Horvitz. Here he has spotted a Gorman-Rupp 40M Pump, Model 34A-VG4D, to dewater the cofferdam 20 ft. down for pilings. Mike says, "We prefer Gorman-Rupp because of their proven dependability."

THE GORMAN-RUPP COMPANY

305 Bowman Street • Mansfield, Ohio

Superintendent A. E. Cline, Columbus Gravel Company, reports . . .

"SUPER-TEMPERED SCREENS Have Cut Our Screen Replacement Costs By 15 to 20%"

Using a 5' x 10' two-deck Deister Vibrating Machine, the Columbus Gravel Company, Columbus, Mississippi, produces about a quarter of a million yards of #4 to 1½" gravel per year.

This machine is equipped with Wissco Super-Tempered Precision Space Screens, according to Supt. A. E. Cline, "because Columbus Gravel is interested in long screen life *and* accuracy.

"Super-Tempered Screens have certainly proved that they give longer resistance to abrasion, vibration and fatigue," Mr. Cline continues. "In addition, they are easy to change and do not work loose under severe vibrating conditions."

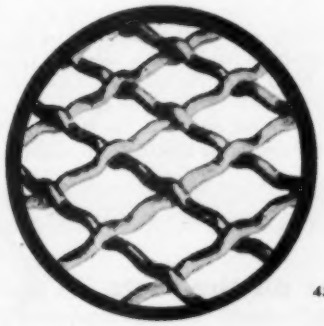
The importance of proper grading at Columbus Gravel is emphasized by the fact that the state highway department makes daily plant inspections to check grading accuracy. "With our Super-Tempered Screens, we never have any trouble meeting these requirements," Mr. Cline reports.

The reason for the long life and amazing accuracy of Super-Tempered Precision Space Screens is simple. It's quality—quality that's built into them at every step. Special wire is oil-quenched for extreme hardness. It's then crimped to precision standards and woven extra tightly on heavy-duty hydraulic looms to assure accurate, uniform spacing under the severest vibration.

Find out how you can use Super-Tempered Precision Space Screens to best advantage in your own operation. Write or phone our nearest sales office today.

CF&I SPACE SCREENS

THE COLORADO FUEL AND IRON CORPORATION



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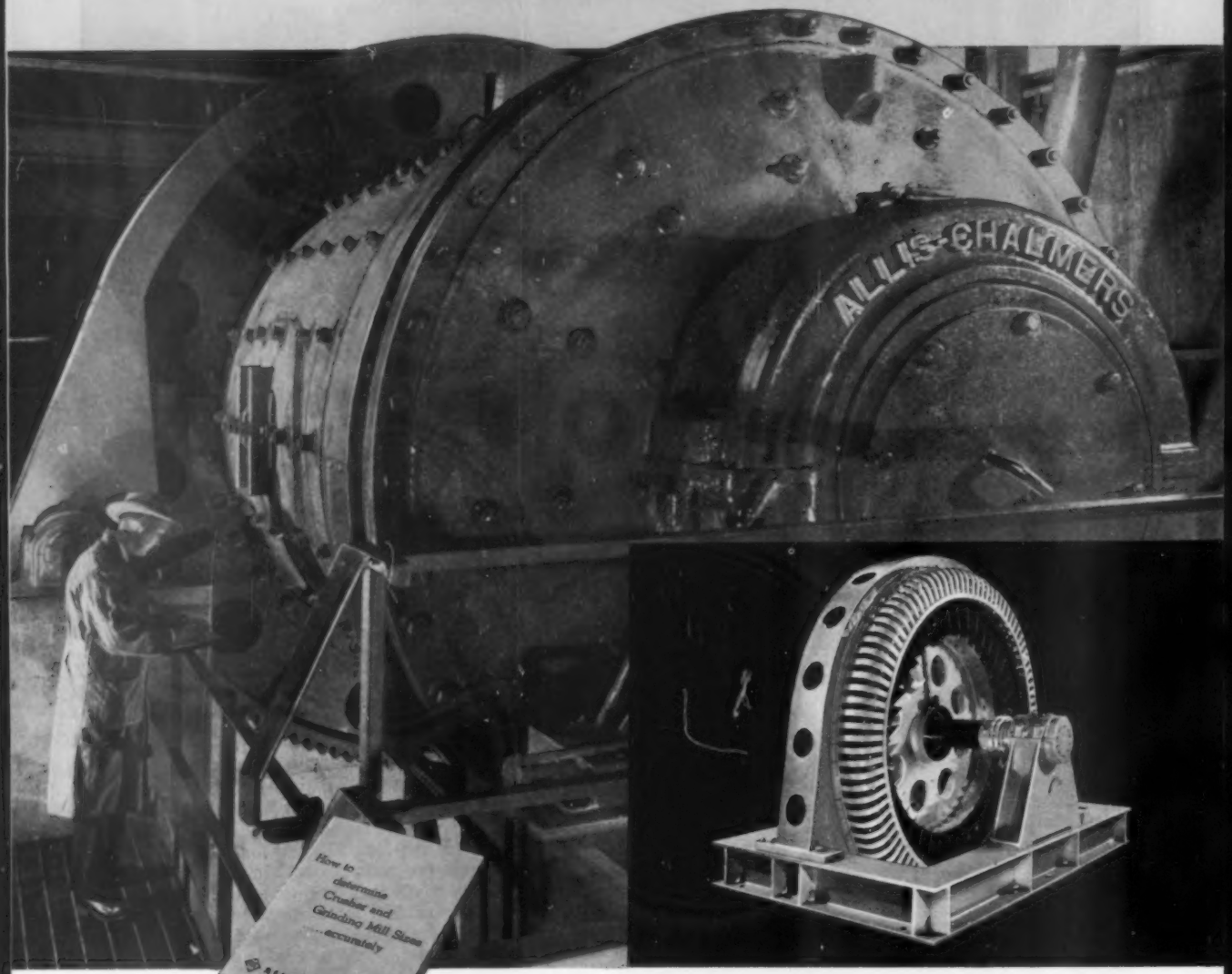

Send for Your Copy

This bulletin with its explanation of the "work index" formula enables you to evaluate any crushing or grinding operation . . . . compare efficiencies of plants, circuits, and machines. Write for this valuable reference. It offers the only truly scientific method of determining the right machine — the only scientific approach to maximum production at lowest cost. Ask for Bulletin 07R7995. Individual bulletins covering specific equipment are also available.

Motors — Should a totally-enclosed or an open-type motor be applied? Is a synchronous motor needed for power factor correction? The right answers to these questions are important to you. By applying the "work index" formula, Allis-Chalmers engineers can determine the required power input and apply the right size motor needed for optimum efficiency. Familiarity with a wide range of cement and processing operations helps us apply the "work index" method to your equipment applications correctly.

Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division. Milwaukee 1, Wisconsin.

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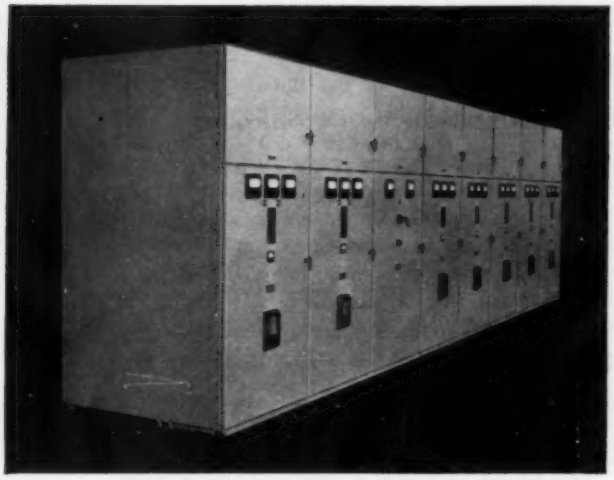
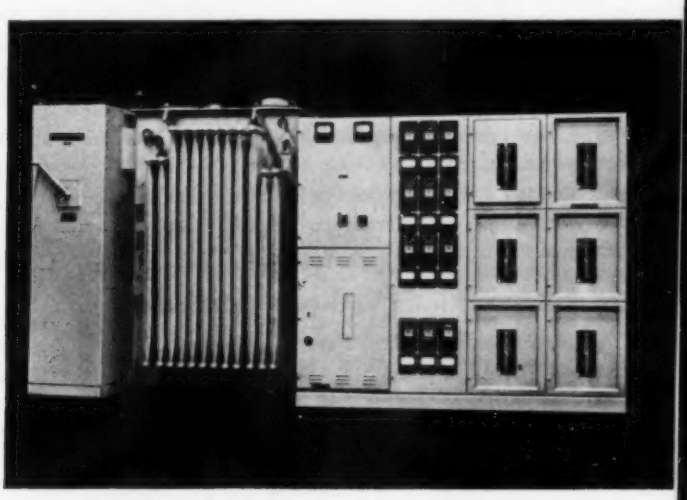
Specify Allis-Chalmers Processing Machinery *And* Electrical Equipment for the Cement Industry

Allis-Chalmers has long been recognized as a leading supplier of processing machinery for the cement industry. In fact more than 50% of the nation's cement is produced with A-C crushers, mills, screens and kilns. Allis-Chalmers is also one of the largest manufacturers of power equipment. *No other company* makes both the mechanical and electrical machinery for the cement industry. As a result, no other manufacturer has comparable facilities and experience necessary to apply and coordinate all equipment for a complete cement plant.

Industry's Top Technical Team at Your Service — Before a recommendation is made, requirements and variables are given a careful going-over by an Allis-Chalmers team comprised of research, design, manufacturing and application specialists from the electrical equipment and processing machinery departments. Characteristics of material, capacity, feed, preparation, balance of gradation, torque characteristics, system power factor needs are some of the many factors evaluated. Ideas and technical information evolving from this "meeting of minds" are then correlated in *one* department specializing in cement industry application. Components are matched to meet the requirements of your job. Responsibility for complete plant efficiency rests with one company.





Control — "Inching" a grinding mill is a push-button operation with synchronous motor control. Holding down the "inch" button rotates mill. The costly, time-consuming inconvenience of transferring from operating bus to inching bus is eliminated by using an automatic throw-over arrangement utilizing two high voltage air contactors.

Completely automatic and packaged pyro-processing control, with speed of feeder and kiln synchronized, is another recent Allis-Chalmers development.

Unit Substations — Allis-Chalmers LCS unit substations pay off in flexibility, ease of installation, maintenance, safety. Completely factory engineered incoming line units, transformer and low voltage switchgear combinations are coordinated and applied specifically for your distribution system. You get features such as breaker storage in the disconnected position in the unit, independent long time and instant trip elements on the breaker, dead-front circuit breaker construction.

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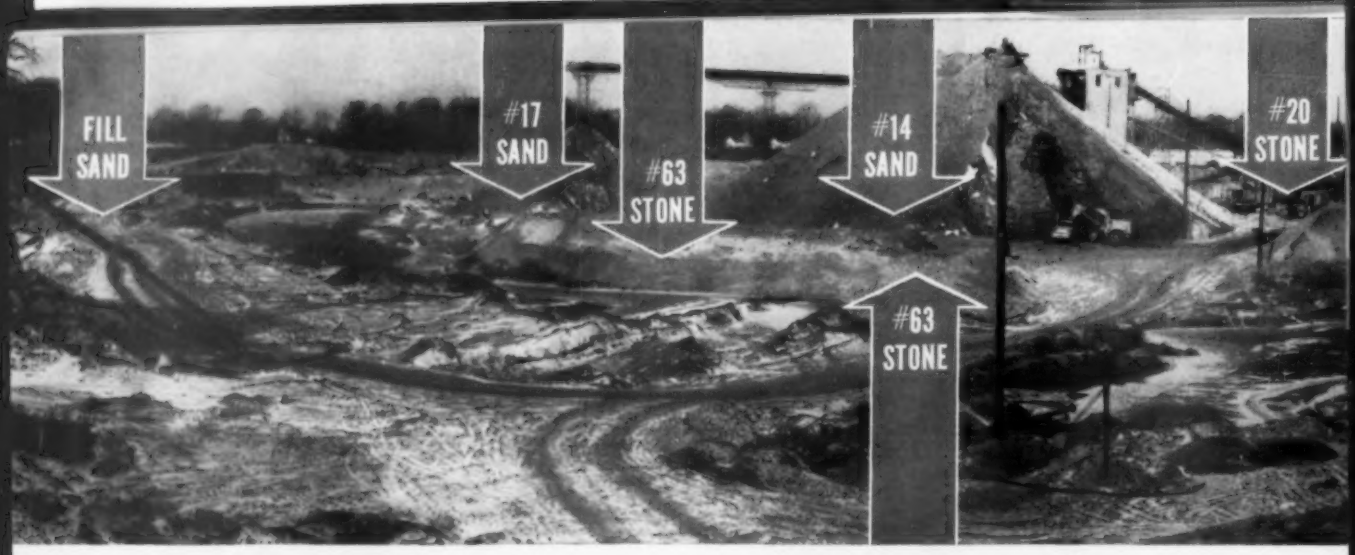


Same hours, same manpower, yet by changing loaders

INDIANA QUARRY QUADRUPLES PRODUCTION

With the same *number* of loaders, and virtually the same number of man-hours, May Sand & Gravel Company, Fort Wayne, has *quadrupled* production (and sales) over the past few years.

Key to their 750,000 ton yearly success story has been the three Michigan Tractor Shovels they brought in to replace a number of less mobile loading units.

Load 550 trucks with 4,500 tons

Accurate records, covering a two year period, show the three Michigans load from 300 to 550 trucks *every nine hour shift.* During peak days their output totals 4,500 tons —a per-unit per-hour average of 175 tons!

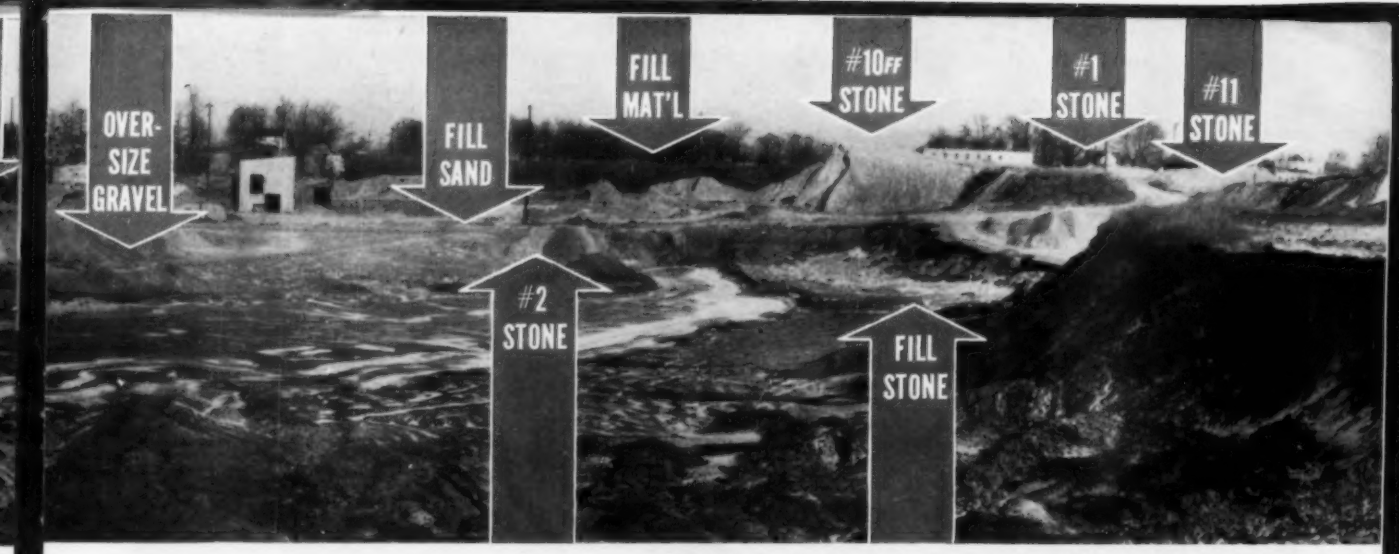
Truckers clear $25 more per day, end gripes

This excellent record has been compiled with only minor changes in methods. Trucks, for example, still are loaded in the order they come into the pit. Formerly, this practice caused frequent delays, often 20 to 40 minutes, while old-style loaders crawled between stockpiles, or labored to load the tougher materials. Now, *even on busiest days,* the Michigans work so fast no trucker waits longer than 2 to 10 minutes from time he drives into the yard until time he's loaded and pulls off the scales. "Trucker gripes have almost disappeared," says Company President Bill May. "The saving of 10 to 30 minutes in pit service often enables each truck to deliver another load or two a day when on long 15 mile hauls . . . an extra two to four loads a day when on shorter one to five mile hauls. That's an extra profit per truck of $5 to $25—or more—every day!"

Fast as trucks between stockpiles

Two major factors combine to produce this time saving. First, the mobile Michigans move from stockpile to stockpile just about as fast as the trucks. Second, the Michigans rapidly load all 10 sizes of stone, two types of gravel, and two grades of sand sold by this plant. Stopwatch measurements, taken from time to time during the past two years, show the 2¾ yard Michigans require only 1½ to 1¾ minutes to heap a 5 yd truck . . . 2¼ to 2½ minutes to load a 9 yarder.

Typical Michigan 2¾ yd load of #14 sand, heaviest of 14 materials handled, weighed out on company scales at 9,000 lbs.



Truck-like speed between stockpiles saves about 1¼ hours per day over crawler-loaders formerly used. Supt. Rooney estimates this time saving, plus lowered repairs, plus faster loading nets his company $70 extra profits per Michigan per shift.

Easy accessibility speeds maintenance

Another important factor in increased plant production has been *dependability*. May Sand and Gravel records show that *not once* in 5½ machine years has a Michigan missed more than a few hours of work. "Sure, we expect our rough service to take its toll," says Jim Rooney, Supt. "But we have a regular program of daily and 100 hour maintenance and inspection that catches what few troubles a Michigan has while they're small. Even when we spot something, even in the rare cases a Michigan breaks down, we always have the machine back to work the next morning! Easy accessibility, skilled workmen, and excellent distributor cooperation make repairs a simple job."

Also do such "extra jobs" as bank loading, pit cleanup

Speed and efficiency help out on extra jobs, too. Three hours every night, and sometimes during the day, one or two of the Michigans clean the quarry floor (this eliminates need for special tractor). Sometimes they load sand fill from bank direct into trucks. At times they level the gravel stockpiles. From 5 to 10 pm some evenings, two of them load non-blasted bank-run sand and gravel. Three trucks are kept busy hauling 2,000 ft to plant for processing. Only light source is own headlights. Average production: 230 tons per hour. And the Michigans have ended worries about rock shovel breakdowns. Supt Rooney reports production loading shot rock with a Michigan of 190 to 200 tons every hour.

Is it any wonder, with all-around performance like this, that May Sand & Gravel Company think Michigan "tops". We think, if you try one, you'll agree. Make your own test. Call or write to arrange a demonstration. You name the job!

Michigan is a registered trade-mark of

CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road
Benton Harbor 37, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

One of Michigan's "spare-time" jobs: hurrying to edge of 30 acre quarry to push off truck-dumped #1 stone.

Excellent service and cooperation from local distributor Deeds Equipment Company is one important reason for May's repeat purchases.

"The big reason for our preference for AMSCO® equipment is the tremendous savings in down time . . ."

"We're well pleased since changing to Amsco," reports William D. Grimstead, plant superintendent at Holliday Sand & Gravel Co. "With our Amsco Pump, it takes us only four hours to change the impeller. With our previous equipment, it would take anywhere from a day to a day and a half."

Holliday uses a 10" heavy-duty Amsco Pump with Amsco pipeline fittings, including valves and elbows. The pipeline is 750 ft. long with an 87-ft. lift. The Swintek ladder on the dredge picks up a mixture of 90% sand and 10% gravel . . . loading 210 tons per average hour. According to Mr. Grimstead, they get an estimated 1700 hours of shell life during normal operation, and 800 hours from the impeller.

"I wouldn't think of ever buying anything but Amsco and I would recommend it most highly to anyone in the field," Mr. Grimstead concluded.

QUICK FACTS ABOUT AMSCO PUMPS

Whether your dredging operation is large or small, you can get an Amsco Pump for the job. There are 40 distinct Amsco Dredge Pump models—each type intended for a specific operating range. Standard sizes range from 6" to 20" discharge openings. Larger sizes are also available.

An Amsco Pump engineer will be glad to discuss your requirements. Write for Bulletin No. 1052P which includes specifications and additional information on the Amsco line of pumps.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

A Size for Every Need...

in the only *Complete* Trailer Line

Athey-Cat PR21-DW21 maneuvers easily in tight quarters, handles big rock.

High-speed production on long hauls with the Athey-Cat PR15-DW15 Rear Dump.

Athey Hydraulic Ejection Trailer gives positive control in dumping and spreading loads.

45-tons to 22-tons — rear dump, hydraulic ejection, side dump, bottom dump — matched trailers for Cat DW21, DW20 and DW15 Tractors — *only* Athey offers you this complete line of capacities and types of high-speed haul units.

Whether it's big rock, clay, ore, mud or earth you have to move, there's an Athey Trailer matched to your quarry operations.

The most complete materials handling trailer line is built by Athey — the leader in the trailer field for more than 34 years. Each unit is built to the rigid standards of quality construction that mean longest life and low maintenance.

This is why Athey Trailers lead the field in big production, fast dumping, easier loading, more profits. Ask your Athey-Caterpillar Dealer for information on the complete line today. ATHEY PRODUCTS CORPORATION, 5631 West 65th Street, Chicago 38, Illinois.

ATHEY TRAILER FACTS . . .

Trailer-Tractor	Capacity
Athey PR21-Cat DW21	34-tons, 22.5 cu. yds.
Athey PR20-Cat DW20	34-tons, 22.5 cu. yds.
Athey PR15-Cat DW15	22-tons, 15.6 cu. yds.
Athey Hydraulic Ejection-Cat DW21 (or DW20)	31-tons, 22.5 cu. yds.
Athey PD20-Cat DW20	30-tons, 22 cu. yds.
Athey PH20-Cat DW20	45-tons, 62 cu. yds.

THE *Complete* TRAILER LINE... *by the Leader*

Athey

Just off the press — describes complete Athey Trailer line. Write today.

SEND FOR TRAILER BOOKLET

IT'S **BRAND NEW**

Cleveland's RC-5 — a new quiet, light-duty electric vibrator

- IT'S QUIET
- DEVELOPS 275 LBS. OF CENTRIFUGAL FORCE
- ALL ELECTRIC
- OPERATES ON LESS THAN .5 AMP. ON 220 V.

Compact design for light duty on bins and hoppers, chutes, tubes, and other storage facilities for bulk materials. Prevents bridging, plugging and arching — eliminates processing delays.

Write for detailed information and prices.

Air or Electric
Portable or Permanent
Silent or Standard

2710 Clinton Ave. • Cleveland 13, Ohio

Manufacturers' News

WALTHER H. FELDMANN has been elected president of the Worthington Corporation, Harrison, N. J. Mr. Feldmann succeeds EDWIN J. SCHWANHAUSSER, who has been named vice-chairman of the board.

Mr. Feldmann was first associated with Worthington in 1944 as president and general manager of the Electric Machinery Mfg. Co., which became a part of Worthington in that year. In 1950 he was elected vice-president in charge of sales, and in 1955, executive vice-president. He had been a member of the board of directors since 1956.

W. H. Feldmann

E. J. Schwanhausser

Mr. Schwanhausser joined Worthington in 1915 in the engineering department of the Harrison, N. J., Works, and served successively as assistant works manager at Harrison and works manager at Buffalo, N. Y. Prior to becoming president, he was elected vice-president in 1939, vice-president in charge of sales in 1945, and executive vice-president in 1949. He has been a member of the board of directors since 1942.

CLARENCE A. HUBERT, formerly manager of engineering of the Farm Tractor Division, has been named general manager of the Construction Equipment Division of the International Harvester Company, Chicago, Ill.

Mr. Hubert joined International Harvester in 1937 as an engine designer at the Tractor Works in Chicago. In 1946 he became engineer in charge of chassis design for farm tractors and crawler-type tractors. At the time of the formation of Harvester's Farm Tractor Division in 1944, he was named chief engineer.

In 1945, Mr. Hubert was appointed assistant manager of engineering of that Division, and in 1946 he became manager of engineering.

The new $1,500,000 plant of the Fuller Company, Catasaqua, Pa., was opened on April 1 at Compton, Calif. Fuller, a subsidiary of General American Transportation Corporation, manufactures pneumatic handling equipment, rotary compressors, vacuum pumps, preheaters, and clinker coolers.

Light metal fabrication facilities for manufacturing Fuller equipment are in operation at the new plant. Fuller maintains a large stock of repair parts at the plant, as well as expanded reconditioning facilities, which will enable the company to provide prompt service for its customers on the West Coast.

The new plant has also enabled the company to expand its depot on Fuller-Kinyon pumps, clinker coolers, rotary compressors, vacuum pumps, and Airslides. A complete line of products of the Sutorbilt Corporation, a Fuller subsidiary, is also being made at the plant. The line includes lobe-type positive pressure blowers, vacuum pumps, vapor compressors, and allied items.

General manager of the new plant is H. J. Thompson. J. L. Verfurth is production manager.

Link-Belt Company, Chicago, Ill., is constructing a $5,000,000 bearing plant in Indianapolis, Ind., to replace and increase by 50 percent the capacity of its present Dodge bearing plant.

Construction is expected to be completed in 1958, and the new plant will be in full production in 1959. The plant will have a total area of more than 400,000 sq. ft., and will embody the latest specialized equipment used in the manufacture of ball and roller bearings, as well as other types of anti-friction bearings.

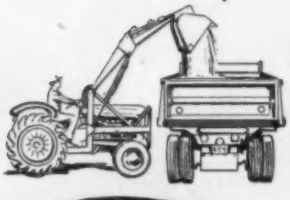
GEORGE F. CROSBY JR. has been appointed manufacturing manager of the Robins Conveyors Division, Hewitt-Robins, Inc., at Passaic, N. J. Mr. Crosby succeeds EDWARD J. MYTKOWICZ, who was appointed manager of operations of the company's Jones Machinery Division, Chicago, Ill.

In his new position, Mr. Crosby is responsible for the functions of production control, stores, shop ordering, methods and production design, and manufacturing.

Look at the lift, compare the price...see how FORD GIVES YOU MORE!

Time the Cycle

Total cycle time of the Ford Loader is less than 11 seconds. Steady operation loads up to 568 yards or 113 truck loads in 8 hours. Tractor hydraulic system is free for use with rear-mounted tools.

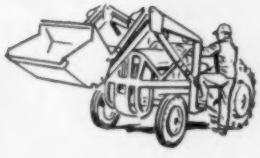


Look at the Lift

10′ 10″ lift to bucket bottom; 8′ 6″ to bucket lip, dumped; 26″ reach dumped at full lift. Generous clearance over average 7′ 6″ truck side. Fill entire truck from one side without "flipping".

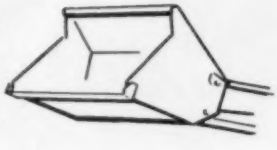
Try the Steering

Compact, close-coupled, maneuvers well in areas other rigs can't even enter! With power steering, a factory option, effortless one-hand steering even on roughest ground leaves other hand free for loader controls.



Measure the Load

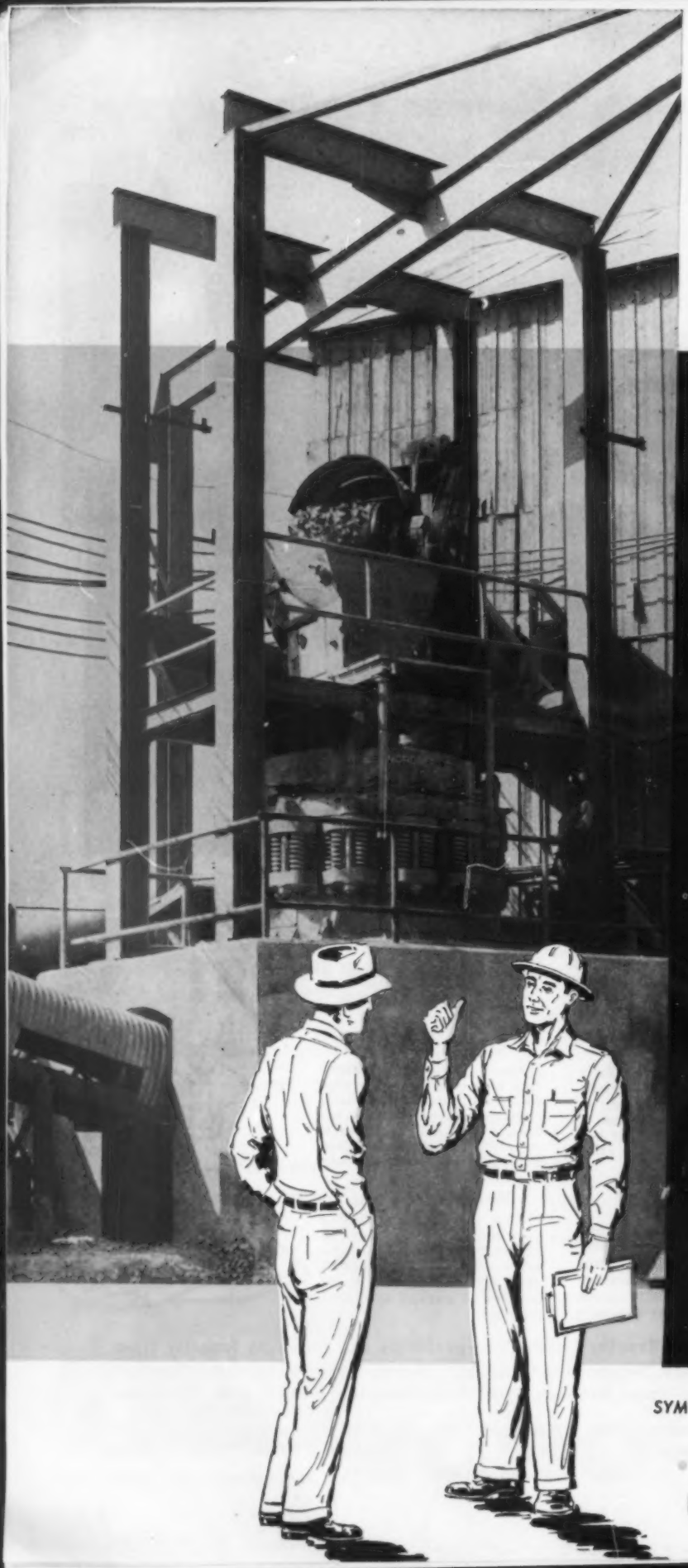
993 lbs., average bucket load—a yard in the truck every 3 cycles. Ford's 2500 lbs. breakaway—more than any other 1000 lb. rated loader—gives faster, easier loading of packed or frozen material.



The Ford Tractor-Loader out-performs any rig in its capacity class and many "bigger" tractor-loaders. Before you buy, *compare!* Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan.

Ford
TRACTORS AND INDUSTRIAL EQUIPMENT

You see more **FORDS** *because they save more money!*



You Get Increased Productivity at Lower Ton-Hour Crushing Cost by using SYMONS® CRUSHERS all the way

SYMONS . . . a registered Nordberg trademark known throughout the world.

NORDBERG MFG. CO.

Milwaukee, Wisconsin

• Symons Crushers are designed and built to produce big tonnages of specification aggregate, bituminous mixes, sand and cement. Higher productivity at the lowest ton-hour cost are two of the sound operating advantages of Nordberg built crushers . . . from the Gyradisc® on up through Symons® Cones and Primary Gyratories.

Every one of these crushers is soundly engineered and ruggedly built to provide today's required performance. Good reason why they are the outstanding choice of leading producers and contractors in the construction of highways, dams and hydro projects, bridges, as well as commercial and residential buildings.

Consult Nordberg soon . . . it will pay you to specify and use Symons Crushers for both stationary and/or portable service.

Write for descriptive literature.

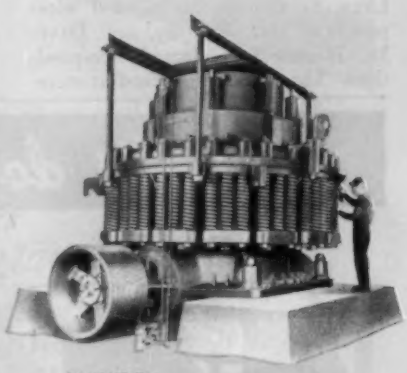
SYMONS 42" GYRATORY CRUSHER

SYMONS PRIMARY GYRATORY CRUSHERS

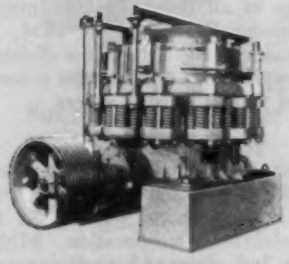
(Left): These gyratory crushers are built for big tonnage, heavy duty primary breaking in 30", 42", 48", 54", 60" and 72" feed opening sizes, for capacities up to 3500 or more tons per hour.

SYMONS STANDARD CONE CRUSHERS

(Right): Standard Type Symons Cone Crushers are built for primary and secondary service in 6 sizes with crushing heads from 2' to 7' in diameter. Capacities in open circuit range from 15 to over 900 net tons per hour.



SYMONS 7'
EXTRA HEAVY DUTY CONE CRUSHER



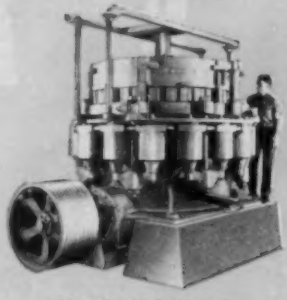
SYMONS 4' SHORT HEAD CONE CRUSHER

SYMONS SHORT HEAD CONE CRUSHERS

(Left): Short Head Type Symons Crushers are built for fine reduction. Offered in 5 sizes with crushing heads from 2' to 7' in diameter. Capacities up to 420 net tph in closed circuit operation, with greatly increased capacities in open circuit crushing.

GYRADISC® CRUSHERS

(Right): Built to supplement the Symons Cone Crusher, the 54" Gyradisc Crusher is providing volume production of still finer specification material, such as ag-lime, limestone chips, sand, rock dust, crushed stone for asphalt mix, and the fine reduction of asbestos and talc.



54" GYRADISC CRUSHER

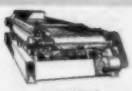
FOR PORTABLE SERVICE

Increasing numbers of portable plant operators are now using Symons Cone Crushers for big capacity of fine product . . . such as the Cedarapids Model 4-ICS portable intermediate crushing plant utilizing a 4' Symons Cone Crusher, shown at the right.

© 1957, Nordberg Mfg. Co.

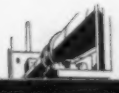
Q457

SYMONS VIBRATING GRIZZLIES



SYMONS VIBRATING SCREENS

NORDBERG GRINDING MILLS



NORDBERG KILNS, DRYERS, COOLERS

NORDBERG ENGINES, 10 to over 12,000 hp

NORDBERG MACHINERY

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • ST. LOUIS • DULUTH • WASHINGTON
TORONTO • MEXICO, D. F. • LONDON • GENEVA • JOHANNESBURG

WILLIAM L. LITLE was elected chairman of the board and president of the Bucyrus-Erie Company, South Milwaukee, Wis., at a recent meeting of the directors. Mr. Litle, who has been president of Bucyrus-Erie since 1952, has been associated with the company for 31 years.

Before becoming president, Mr. Litle had been executive vice-president for two years. He has served on the board of directors since 1947.

In other management changes, LYLE S. CLINE was elected vice-president and secretary, and DAVID W. HARRIS was elected vice-president. Mr. Cline has served as secretary for 5 years. Mr. Harris formerly was director of industrial relations.

WILLIAM W. COLEMAN, retired chairman of the board and chairman of the executive committee, has been named honorary chairman of the board. Mr. Coleman, a member of Bucyrus-Erie for 52 years, was president for 32 years beginning in 1911; chairman of the board since 1927; and chairman of the executive committee since 1941.

Officers re-elected to another term include Peter H. Birckhead, Frederick C. Weiblen, George Y. Anderson, and John A. Wettergreen, vice-presidents; and Victor C. Studley, treasurer.

W. L. Litle

M. Nielsen

M. NIELSEN has been elected president of The Babcock & Wilcox Company, New York, N. Y., succeeding ALFRED IDDES, who has retired after serving as president since 1948. Mr. Nielsen has held the position of executive vice-president of the company for the last two years.

Mr. Nielsen has 33 years of experience with the firm, having joined Babcock & Wilcox in 1924 as a construction worker in the company's Chicago district. Since then he has held many positions, including superintendent of marine erection, production superintendent at the Barberton, Ohio, plant, executive assistant, and assistant vice-president.

In 1953, when Mr. Nielsen was appointed vice-president, he assumed charge of all Boiler Division manufacturing. Re-elected in 1954, he was made head of the entire division, and at the same time became a member of the board of directors.

KENNETH E. BLESSING has been appointed sales manager of the Dust and Fume Control Division of the Wheelabrator Corporation, Mishawaka, Ind. Prior to his appointment, Mr. Blessing was district manager of the firm's New York office, a position he has held since 1949.

Wheelabrator has appointed Lawrence W. Kohlmeyer district manager of the firm's New York office, succeeding Mr. Blessing. Mr. Kohlmeyer was previously district sales engineer in Wheelabrator's Chicago office.

George F. Jones, formerly in the Abrasive Sales Division of Wheelabrator, replaces Mr. Kohlmeyer in the Chicago office.

GEORGE MILBURN has been appointed sales supervisor of The Patterson Foundry and Machine Company (Canada) Ltd., Toronto, Ont., Can. In his newly-created position, Mr. Milburn will co-ordinate district sales activities in Canada to facilitate customer service from his headquarters in Montreal.

What's down there?

Empire
TEST DRILLS
come up with the
RIGHT ANSWERS

EMPIRE
Hydraulic
Testing
Drill

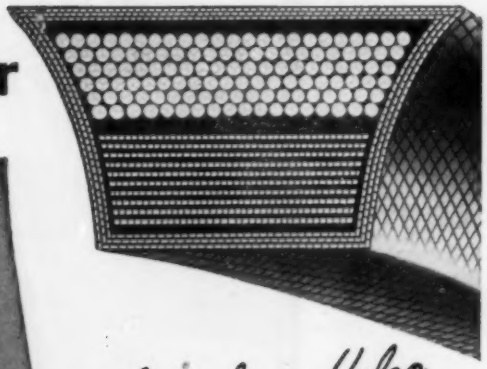
This test-drilling equipment is a "must" for pit and quarry operators and general contractors.
The EMPIRE Junior Drill used manually with solid rods or the EMPIRE Hydraulic Jetting Drill, using hollow rods, is the standard method of exploring sand and gravel deposits for composition and presence of clay, and accurately determines overburden depth and formation.
Easily transported in any kind of terrain. Assembled and ready for work in minimum time with ordinary labor.

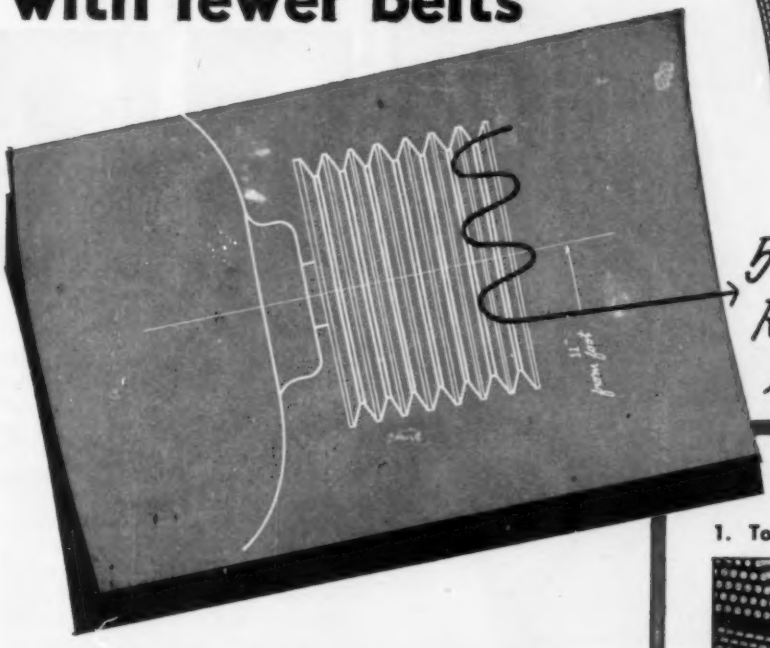
Write TODAY for complete details

NEW YORK ENGINEERING CO. 75 WEST STREET NEW YORK 6, N. Y.

Cut sheave width and weight...

get same horsepower with fewer belts





5 Gates Super Vulco Ropes do the work of 7 standard V-belts

Where space is limited and weight a factor, design your drive with this important fact in mind:

5 Gates Super Vulco Ropes do the work of 7 standard V-belts

That's because a Gates Super Vulco Rope has 40% more horsepower capacity — delivers more horsepower per dollar invested than any standard V-belt drive. Sheaves with fewer grooves cost less . . . weigh less . . . take less room. Drive design is invariably improved.

A wealth of drive data is quickly available to you. Simply call your nearby Gates distributor for a Gates V-belt specialist. Stocks carried in industrial centers around the world.

The Gates Rubber Company
Denver, Colorado

GATES Distributors are in the Yellow Pages

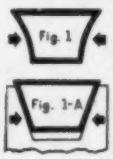
The Mark of Gates *Specialized* Research

No other V-Belt has ALL these advantages

1. Tough, resilient Tensile Cords

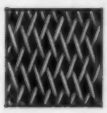
Super strong resilient tensile cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required . . . save weight and space.

2. Concave Sidewalls (U.S. Pat. 1813698)



Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Flex-Weave Cover (U.S. Pat. 2519590)



A Gates exclusive: provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

4. High Electrical Conductivity

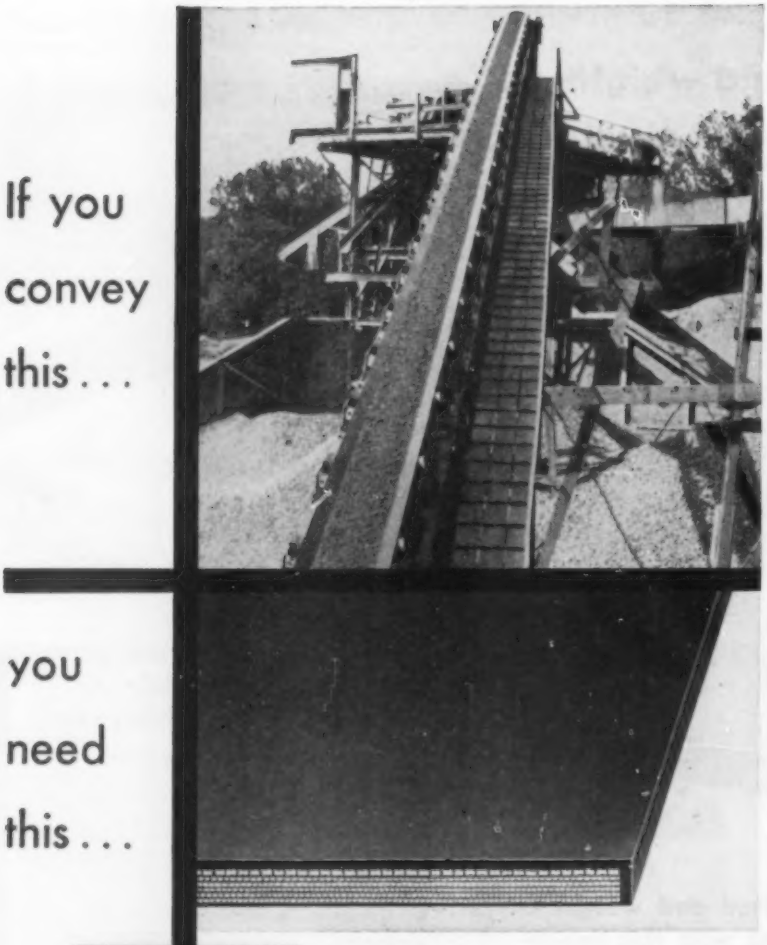
Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

5. Oil, Heat, Weather Resistant

Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure to weather.

TPA 248

Gates Super VULCO ROPE Drives



QUAKER CONVEYOR BELTING FOR TOUGH SHOCK RESISTANCE!

The Quaker belt you see above is made especially to take the impact and abrasive wear of sharp, jagged loads.

Carcass is formed of multiple plies of strong, high-quality cotton duck, with skim coat between plies. Average cover tensile strength is 2500 to 3000 lbs.

Do you need even greater troughability, flexibility or tension rating? Quaker can supply belts of new high tensile strength rayon or cotton-nylon fabrics. Any desired cover thickness.

Your Quaker Rubber-Quaker Pioneer Rubber distributor also carries a complete line of hose, packing and moulded rubber products for every use. Call him today.

For free brochure, please write to:
H. K. Porter Company, Inc.,
Quaker Rubber Division,
Philadelphia 24, Pennsylvania, or
Quaker Pioneer Rubber Division,
Pittsburg, California.

HKP QUAKER RUBBER DIVISION
QUAKER PIONEER RUBBER DIVISION
H. K. PORTER COMPANY, INC.

The Cleveland Worm & Gear Company and its affiliate, The Farval Corporation, Cleveland, Ohio, announce the election of GEORGE H. ACKER as president and HOWARD DINGLE as chairman of the board of both companies. All other officers were re-elected, including Willis W. Clark, vice-president.

G. H. Acker

H. Dingle

Both Mr. Dingle and Mr. Clark became interested in The Cleveland Worm & Gear Co. in 1924. Under their leadership, the firm has become an outstanding manufacturer of worm gear power transmission equipment.

Mr. Acker joined Cleveland Worm & Gear in 1923. He was appointed vice-president in charge of engineering and production in 1942, and executive vice-president in 1952.

Mr. Dingle joined the organization as vice-president and general manager and has served as president since 1927.

Continental Gin Company, Birmingham, Ala., has inaugurated a multimillion-dollar expansion program to broaden its diversification and provide additional facilities for a growing volume of business.

The program, which will require several years to complete, encompasses improvements to all of the company's facilities in Birmingham and Prattville, Ala., Atlanta, Ga., Dallas, Tex., and Memphis, Tenn. Major capital expenditures will be made at the company's Birmingham plant, which will eventually be utilized by the Industrial Division. It produces materials handling equipment under the Continental name and many types of custom-made machinery, machine tools, and other high-quality precision machinery for industry in general.

Improvements in Continental Gin's other plants will embrace substantial additions to office space and facilities at the Dallas and Memphis properties, and construction of and equipment for several new buildings at Prattville, Ala.

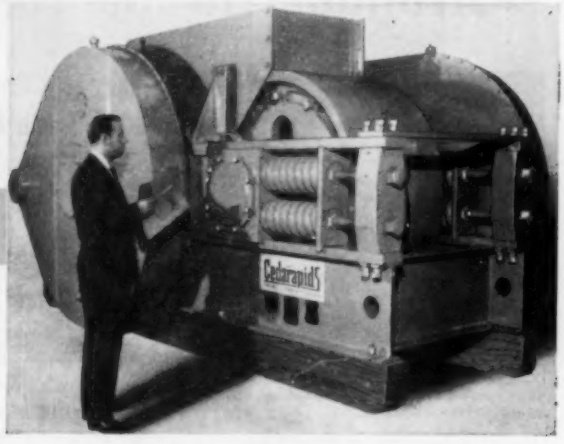
BIG-NEW

Cedarapids Crushers and Screens to increase your Plant Capacity

The amount of aggregate needed for the National Highway Program will equal, in volume, five hundred Egyptian pyramids, each covering four city blocks and 40 stories high! You'll need big-capacity equipment to produce your share of this mountain of material. That's why Cedarapids has engineered big new crushers and screens to help you increase your plant capacity.

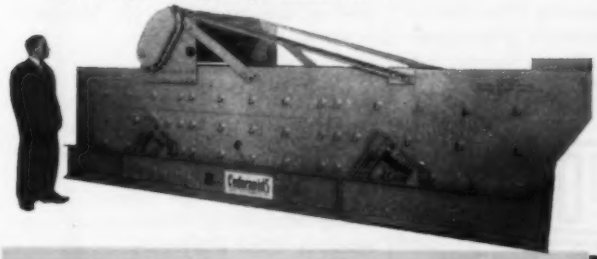
BIG PRIMARY

This newly engineered 42" x 48" Jaw Crusher meets every demand for big primary crushing operations with capacities ranging up to 775 tons per hour, depending upon the size of product desired and the characteristics of the material. The crusher base is stress-relieved to insure maximum strength for weldments, and fabricated with heavy rib-reinforcement to withstand the punishing shock of heavy loads.



BIG SECONDARY

The Cedarapids 55" x 30" Roll Crusher is the efficient teammate for the big primary crusher, or can be used wherever there's need for high capacities of fine-crushed products. Output ranges up to 850 tons per hour, depending upon the size of the finished product. The large 55" diameter of the rolls easily handles large size feed. Like all Cedarapids roll crushers, Model 5530 can be equipped with two smooth or two corrugated roll shells, or one of each, to meet operating requirements.



BIG SCREEN

Big crushing production demands big screening capacity. The new 60" x 16' triple-deck Horizontal Vibrating Screen is designed to insure accurate gradation of the big-volume output of Cedarapids crushers. The horizontal position of the screen provides as much as 12½% more screening area than an inclined screen of the same length! The screen box and screen cloth support frames are stress-relieved for longer service life and lower maintenance costs.

Before you plan your next big crushing and screening operation, be sure to investigate the "big-production-at-low-cost" advantages of Cedarapids equipment. Your Cedarapids distributor will help you plan for higher tonnages and greater profit.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

You pay less for this stronger thread for bags

"SUPER CORDURA" SEWING THREAD reduces bag breakage resulting from rugged handling, because seams are much stronger.

"SUPER CORDURA" can be sewn with smaller needles, preventing material losses caused by sifting.

HIGHLY EFFICIENT "SUPER CORDURA" REG. U. S. PAT. OFF. REDUCES BAG AND CLOSING COSTS

GREATER seam strength, increased sewing efficiency, lower cost—these are the advantages of sewing bags with Du Pont "Super Cordura"* high tenacity rayon.

Because "Super Cordura" is far stronger than ordinary-fiber threads, danger of seam breakage is minimized—drop tests prove it. And because sewing with "Super Cordura" is more efficient, you save money in your closing operations. There are less breaks during closing; one thread does most jobs, reducing thread inventory.

Consider the advantages of bags sewn with Du Pont "Super Cordura" the next time you order multiwalls . . . and order it for use in closing, too.

E. I. du Pont de Nemours & Co. (Inc.), Textile Fibers Department, Wilmington 98, Delaware.

*"Super Cordura" is Du Pont's registered trademark for its high tenacity rayon yarns.

DU PONT
REG. U. S. PAT. OFF.
Better Things for Better Living . . . through Chemistry

THREAD OF "SUPER CORDURA"... easier to sew
. . . costs less than conventional thread . . . extra-strong

HENRY M. JAMESON has been appointed general manager of the Drill Division of the Bucyrus-Erie Company, South Milwaukee, Wis. Mr. Jameson will have his headquarters at Richmond, Ind.

Before joining Bucyrus-Erie as tractor equipment sales manager in 1937, Mr. Jameson was associated with the Insley Manufacturing Company and the Allis Chalmers Manufacturing Company.

Bucyrus-Erie is constructing a new plant, scheduled for completion in 1958, which will provide 300,000 sq. ft. of floor space for the manufacture of Bucyrus-Erie's complete line of water well drills, oil well spudders, and blast hole drills.

H. M. Jameson

N. M. Reiners

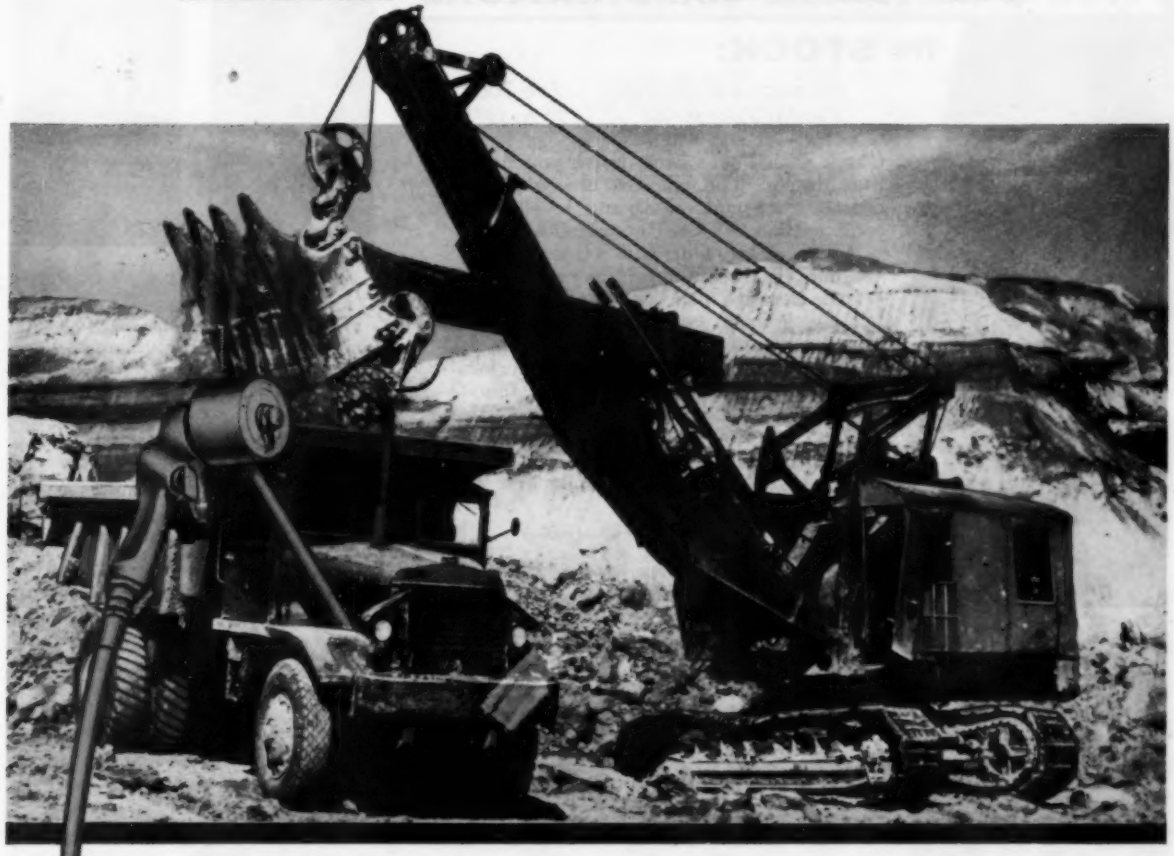
N. M. REINERS, who has been associated with the Cummins Engine Company, Inc., Columbus, Ind., for 20 years, has been named vice-president—research. During his association with Cummins, Mr. Reiners has served as a design engineer, technical analyst, manager of research laboratory, manager of research and refinement, and director of research.

At the annual meeting, directors re-elected C. L. Cummins honorary chairman of the board; Mr. Miller, chairman of the board; Mr. Huthsteiner, president; Mr. Tull, executive vice-president; Mr. Boll, Mr. Bollwinkel, D. J. Cummins, Mr. Fox, Mr. Harrison, Mr. McMullen, and Mr. Stoner, vice-presidents; and W. J. Manning, assistant secretary and assistant treasurer. Mr. Harrison is secretary and treasurer.

ARNOLD W. ASMAN has been appointed product manager of mining equipment sales by Hewitt-Robins, Inc., Stamford, Conn., effective July 1. Mr. Asman was formerly head of the department of mining at Pennsylvania State University.

Mr. Asman succeeds R. U. Jackson, who is scheduled to retire in 1959, and in the interim will be assigned to the sale of large conveyor contracts and will also be available for consultation on mining problems.

Two-fisted for tough going!



Your Diesel engines run better, last longer when you change to Sinclair Super TENOL® Motor Oil.

Sinclair Super TENOL safeguards your equipment against the damaging effects of high temperature and continuous stop-and-go operation.

Sinclair Super TENOL withstands such punishing conditions because it's specially made for tough going. High viscosity index base oils, combined with an exclusive formula of selected additives, give your Diesel the greatest protection against varnish, sludge, rust and acid corrosion.

Refill now with Sinclair Super TENOL Motor Oil. Contact your local Sinclair Representative for further information, or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N.Y. *There's no obligation.*

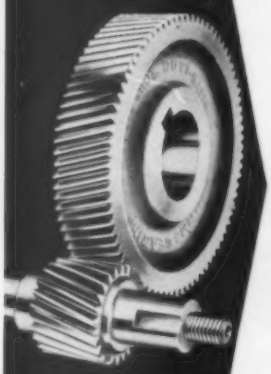
Dino, the Sinclair Dinosaur, says:

SINCLAIR SUPER TENOL

PREMIUM GEARING
at Production-Run Prices

Foote Bros. Offers Engineered Helical and Worm Gear Sets FROM STOCK

1638 Duti-Rated COMBINATIONS



IN STOCK:

*Horsepower Ratings....1 to 200**
*Center Distances.....2" to 12"**

Check with Foote Bros. *before* you finalize that design. The chances are you'll find exactly what you need among the 1638 *stock* combinations of Duti-Rated Helical Gears.

When you buy Duti-Rated Gearing, you'll get more than best for your money . . . you'll get the benefit of thousands of engineering and development hours . . . and the unquestioned advantages of precision tooling and manufacturing methods. You'll get performance proven in countless Foote Bros. Line-O-Power and special drives, and Foote Bros. —Louis Allis Gearmotors. This is high hardness, accurate, balanced design gearing that will give you more load capacity and wear life per dollar.

**Larger sizes made to order from standard tooling.*

Write for DUTI-RATED catalog: Engineering Manual DR No. 2.

150 WORM GEAR COMBINATIONS

IN STOCK:

Horsepower Ratings....1 to 100†
Center Distances.....2" to 12"†

Need worm gear and worm sets? There is economy and convenience in choosing them from the many Foote Bros. worm gear combinations available from stock. This is the same gearing used in famous Foote Bros. HYGRADE Enclosed Worm Gear Drives . . . engineered, premium quality gearing at production-run prices.

Engineering Manual SW No. 1 has complete details. Write for your copy.

† Tooling available for larger worm gear sets, engineered, but not stocked, to 200 HP and 18" centers. Prompt deliveries.

ENGINEERING SERVICE

Let us help you select standard helical or worm gearing to meet your special requirements, or, let us design and build your complete unit. Place your gear problems in the hands of experienced power transmission and gear engineers. Your inquiry is invited, and there's no obligation.

FOOTE BROS. Duti-Rated LIFETIME GEARING

this trademark stands for the finest industrial gearing made

FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
4571 South Western Boulevard, Chicago 9, Illinois

JAMES A. LIND was named vice-president, finance, and JOHN F. CORKERY was appointed vice-president, public relations, of the Thor Power Tool Company, Chicago, Ill.

Mr. Lind joined Thor in 1937, as auditor, and became comptroller in 1939 and treasurer in 1942. He will continue in his post as treasurer.

J. A. Lind

J. F. Corkery

In his new position, Mr. Corkery will be in charge of public relations, advertising, and sales promotion. He joined Thor in 1942 as assistant editor of the *Thor Scoreboard*, and has served as assistant sales promotion manager and promotion manager. In 1952 he became manager of the company's electric tool division, and in 1954, returned to sales promotion.

Appointment of H. FOLLETT HODGKINS JR. to the post of assistant general manager of the Rollway Bearing Co., Inc., Syracuse, N. Y., was announced recently. In his new capacity, Mr. Hodgkins will assist in the overall supervision of Rollway's three Syracuse plants.

Mr. Hodgkins joined Rollway Bearing Co. in 1951. A member of the board of directors, he has served in the company's time-study and methods department, as assistant superintendent of the manufacturing department, and as assistant to John D. Williams, vice-president and general manager.

WALLACE COLLETT has been named product sales manager, Material Handling Department, Tractor Group, Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Mr. Collett was previously associated with the Tractor Group's Sales Training Section at the home office in Milwaukee.

The retirement of G. B. Griffiths, office manager of the Explosives Department of the Hercules Powder Company, Wilmington, Del., has been announced. Mr. Griffiths has been associated with the firm for 41 years.

There's a new and interesting treat in store for you when this traveling Atlas ROCKMASTER® *Exhibit comes rolling into your area.*

Atlas has virtually put a theater on wheels, to bring you a complete demonstration of efficient, modern blasting methods. In this unusual exhibit booth, you can relax in a comfortable seat while sound films in color bring you the latest and best information on modern confined blasting: the kind that provides maximum breakage with minimum noise and vibration. In special stereo viewers, you can examine the details of blasting action and loading techniques which you may be able to apply in your operations.

Charts and other visual exhibits are displayed to make your "visit in the Volkswagen" the most interesting, informative half-hour you've ever spent! You'll see the latest drilling, loading and shooting methods, graphically illustrated . . . a bus load of ideas which could mean increased profit for you through better blasting.

It's another first by Atlas, and is now starting to tour the country. Don't miss it. Check with your Atlas representative to find out when it will be in your area!

Bus Load of Blasting Ideas . . . *coming your way*

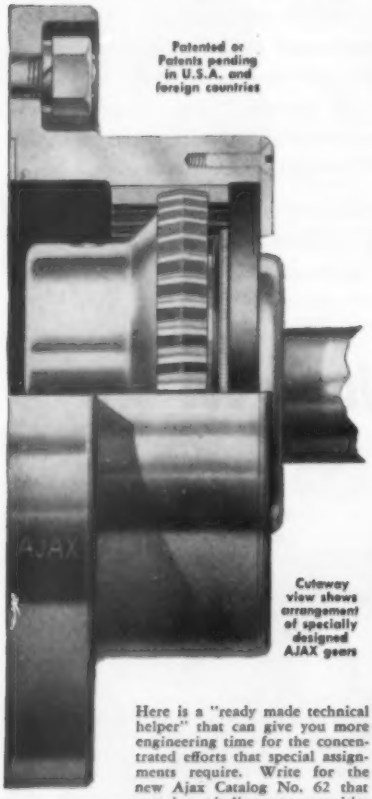
EXPLOSIVES DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE
offices in principal cities

AJAX

Self-aligning

DIHEDRAL COUPLINGS

Give Design Engineers An Immediate Source of Product Improvement



Cutaway view shows arrangement of specially designed AJAX gears

Here is a "ready made technical helper" that can give you more engineering time for the concentrated efforts that special assignments require. Write for the new Ajax Catalog No. 62 that contains misalignment capacities of every coupling size and type in the complete line of Ajax Dihedral Couplings. Why spend valuable time duplicating data already established by thousands of proven, field tested applications.

Ajax Dihedral Couplings handle unavoidable shaft misalignment, angular and offset, up to a total of 12°. Teeth can be cut to handle greater misalignment capacities on special order.

Get the facts on how manufacturers of presses, machine tools, rolling mills, cranes, earth moving and many other direct connected machines are simplifying design, cutting manufacturing costs and improving product performance with Ajax Dihedral Couplings.

Write today for your personal copy of Bulletin No. 62.

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK

WILLIAM R. ADAMS has been elected president of the St. Regis Paper Company, New York, N. Y., succeeding ROY K. FERGUSON, who continues as chairman of the board and chief executive officer.

Mr. Adams, who joined St. Regis in 1937, has been vice-president since 1949, in charge of all manufacturing since 1953, and a director since 1952. Mr. Ferguson has served as president of the firm since 1934, and is completing his fortieth year with the company.

In a series of other top executive changes, Edward R. Gay was elected vice-chairman of the board. Arch Carswell and Benton R. Cancell were elected executive vice-presidents.

Mr. Gay, who has served as executive vice-president since 1951, and a director since 1941, joined St. Regis when the company acquired Bates International Valve Bag Co., of which he was vice-president.

Arch Carswell joined St. Regis in 1928, and has served as a director since 1952. Mr. Carswell served with St. Regis in sales management posts in the Midwest and on the West Coast prior to his transfer to the New York office as general manager of the Multiwall Packaging Division and his subsequent appointment as vice-president in charge of sales.

Mr. Cancell is president of the Rhinelander Paper Company, which became a subsidiary of St. Regis in 1956.

W. R. Adams

F. G. Hough

FRANK G. HOUGH, founder and chairman of the board of The Frank G. Hough Company, Libertyville, Ill., has announced his retirement.

A pioneer in the bulk materials handling and tractor-shovel fields, Mr. Hough designed and sold his first hydraulic shovel attachment while vice-president and general manager of the Blair Manufacturing Co., Chicago.

In 1931 he acquired the Blair Manufacturing Co., and in 1933 The Frank G. Hough Co. was incorporated. For several years the newly-formed company originated, designed, and engineered its own products and maintained its own selling staff, but subcontracted the manufacturing operations to other companies.

The Frank G. Hough Co. moved from Chicago to its present location in Libertyville in 1939, and at that time manufacturing and service facilities were established. In 1952 The Frank G. Hough Co. became a wholly-owned subsidiary of International Harvester.

Mr. Hough plans to remain in the manufacturing business, and will open an office at 158 E. Cook St. in Libertyville.

Several promotions at the Marion Power Shovel Co., Marion, Ohio, have been announced by the board of directors.

Robert Campello, formerly general sales manager, has been elected vice-president for sale of small machines. Mr. Campello, who joined the organization in 1955, is responsible for the company's parts and service departments, in addition to his sales responsibilities.

Martin R. Tuttle, previously general works manager, has been appointed vice-president for production. A veteran Marion employee for almost 40 years, Mr. Tuttle will continue his responsibilities as general works manager.

William R. LeMasters, formerly treasurer, has been promoted to the position of secretary and treasurer. David Reich was elected to the newly-created position of assistant to the president.

Other officers re-elected were M. T. Smith, president and general manager; A. F. Busick, vice-president for engineering; and David E. Rizor, vice-president for large machine sales.

Hendrickson Manufacturing Co., Lyons, Ill., has appointed RALPH T. BUTLER southwest sales and service representative. Representing Hendrickson on tandem axle units, custom built trucks, crane carriers, and special motor truck equipment, Mr. Butler will contact all motor truck dealers, distributors, branches and factories, trailer manufacturers, and fleet truck owners and operators in the company's southwest territory.

American MARC Inc., manufacturer of air-cooled diesels, has acquired the factory of the Hallett Manufacturing Company, Inglewood, Calif., according to a recent announcement.

SECO

HELPING MAKE *Cushions* for *Superhighways*

Photographed on the job at Gary Slag Corp., Gary, Ind.

at Gary Slag Corp., Gary, Ind.

Indiana's giant, modern roadbuilding program is in full swing and Gary Slag Corporation is taking an active part in it.

For instance, Gary Slag has met the strict specs. of the new Indiana East West Toll Road in supplying the sub-base cushion for ten miles of this road. In addition, they have supplied concrete aggregate for twenty miles of the same road and they have furnished a large amount of macadam paving material. Ten SECO screens are taking an important part in this operation, too! Gary Slag Corporation estimates that they have screened and sized over 7 million tons of specification material over SECO screens since 1947.

In the words of Mr. P. J. Mack, General Supt. of Gary Slag Corporation "We can't praise our SECO's enough for dependability, accurate sizing and minimum down time. They take tremendous loads without a whimper."

SECO scalper screens 400 T. P. H.

Seco screen in tower of Gary's lightweight aggregate plant

Outgoing materials to meet toughest specifications

SEND FOR SECO CATALOG #204

SCREEN EQUIPMENT COMPANY, INC.

Buffalo 25, New York

High Pile Discharge

Full 60° Dumping Angle

Rugged Stability

OMAHA STANDARD

END DUMP TRAILER

Accurate load distribution. Made in all sizes. Write for details.

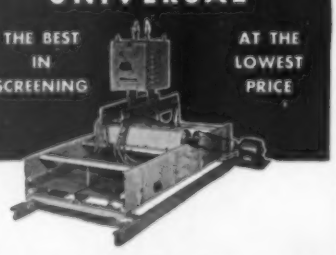
Distributorships available in some areas.
"Custom-Made Material Trailers—for ANY Commodity"

OMAHA STANDARD
2401 W. Broadway, Co. Bluffs, Ia.

UNIVERSAL

THE BEST IN SCREENING

AT THE LOWEST PRICE



THE MOST MODERN AND EFFICIENT ELECTRIC HEATING EQUIPMENT AT A REASONABLE PRICE

- VIBRATING SCREENS — All sizes and types.
- UNILEC HEATING EQUIPMENT
- UNIFLEX VIBRATORS
- UNIVIBE RIDDLES

WRITE FOR NEW CATALOG No. 150.

UNIVERSAL VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

The J. B. Ehrsam & Sons Mfg. Co., Enterprise, Kans., has established a subsidiary company, Ehrsam Pacific, Inc., to serve the western states of California, Oregon, Washington, Idaho, Montana, Arizona, and Nevada.

Located at 3972 Main St., Riverside, Calif., the new company will be managed by R. K. Yancey. Mr. Yancey, who has been with the Kansas firm for many years, was recently in charge of its sales office in Riverside which has been discontinued. Larry Pittman and Robert Fyfe, former Ehrsam men, will serve as sales representatives.

Ehrsam now has sales offices located in Denver, Colo., and Kansas City, Kans. The firm's products include industrial passenger elevators and manlifts and complete wallboard manufacturing plants.

Superior Equipment Division, Wheeling, Ill., has appointed twelve new distributors to handle the Superior line of heavy-duty tractor-mounted loaders in the United States and Canada.

J. S. Woodhouse Co., Brooklyn, N. Y., will handle the Superior line in New York, Connecticut, Massachusetts, Vermont, New Hampshire, Maine, New Jersey, Pennsylvania, Delaware, and Maryland. Other distributors appointed are Maumee Valley Seed Service, Inc., Ft. Wayne, Ind.; Michigan Equipment Sales Co., Lansing, Mich.; Hammes Equipment Sales, DeKalb, Ill.; Farm Power Corp., Fond du Lac, Wis.; Lindsay Bros. Co., Minneapolis, Minn.; T. S. Cowger Co., Great Falls, Mont.; and Towner-Meyer Co., Stockton, Calif.

In Canada the Superior line will be represented by Eastern Farm Machinery, Ltd., Guelph, Ont.; Bethel-Rennie, Ltd., Winnipeg, Man.; Spence Farm Equipment, Ltd., Saskatoon, Sask.; and B. C. Tractor Equipment, Ltd., Vancouver, B. C.

According to a recent announcement, the H. K. Porter Company, Inc., New York, N. Y., has acquired the Federal Wire & Cable Company, Ltd., Guelph, Ont., Canada's fourth largest manufacturer of wire and cable.

Harold F. Nunn, vice-president and general manager of the H. K. Porter Company (Canada) Ltd., a wholly-owner Porter subsidiary, will move his headquarters from Toronto to Guelph to supervise the new operation. Mr. Nunn will continue to supervise Porter's other Canadian business, the Henry Disston Division, with plants in Toronto, and Vancouver, and sales representation for several Porter divisions in the United States.

J. Godfrey Smith, founder and president of Federal, will retire, but will be available to the new Porter division for consultation. His son, Thomas G. Smith, has been named Federal's general sales manager.

Both the plant and head offices of Federal are located in Guelph; sales offices are in St. John's (Newfoundland), Truro, Montreal, Winnipeg, Regina, Saskatoon, Calgary, Edmonton, and Vancouver. A new warehouse recently has been opened in Montreal.

The AmForge Division of the American Brake Shoe Company, New York, N. Y., has announced the assignments of Arthur Netterstrom as executive assistant to the president, Francis Moore as sales assistant to the president, Robert Crocombe as vice-president in charge of sales, and Stanley Dawson as vice-president in charge of operations.

Mr. Netterstrom, formerly first vice-president, has been with the firm since 1924. He has held various supervisory positions until 1940 when he was appointed vice-president of the division. He became first vice-president in 1943.

Mr. Moore, formerly vice-president in sales, joined the firm in 1919, and became vice-president in 1941. Mr. Crocombe, previously assistant vice-president in sales, joined the firm in 1937. Stanley Dawson joined the firm in 1954. Prior to his latest appointment he served as technical assistant, sales.

At a recent meeting of the directors of the Macwhyte Company, Kenosha, Wis., the following officers were re-elected: George C. Wilder, president; E. C. Berg, vice-president and controller; F. D. Holden, vice-president in charge of sales; and Goodwin Johnston, secretary-treasurer.

Re-elected to the board of directors were George C. Wilder, E. C. Berg, Goodwin Johnston, R. B. Whyte, James T. Wilson, F. Hinrichs, and Roger Palmer.

A. A. Wallach, a specialist in copper mining and ore processing, has joined the Kaiser Engineers' Development Division, Oakland, Calif. Mr. Wallach is responsible for project analysis in the fields of mining and quarrying, rock products, ore processing, and non-ferrous metals.

Proven quarry worker available

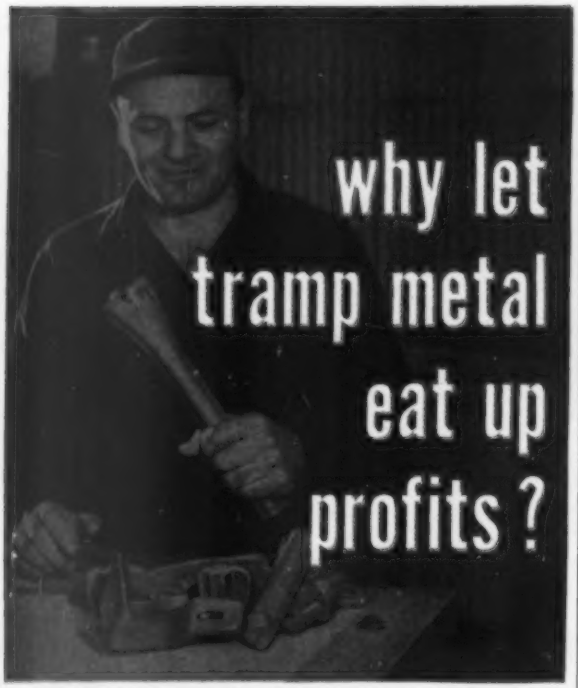
HAS FOUR-YARD SHOVEL . . . WILL TRAVEL

Will travel . . . there's the key to the real value of an Allis-Chalmers HD-21G tractor shovel. It not only digs and loads four yards at a pass, it is mobile enough to work in all parts of the pit . . . and flexible enough to do many different jobs well.

Besides loading trucks, the HD-21G can help maintain haul roads, carry material from quarry face to stockpile, feed or clean up around conveyors, or even travel out of the quarry to clear land for future operations.

Let your Allis-Chalmers dealer show you the many ways an HD-21G can work profitably for you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*



Assortment of tramp metal detected at Lithium Mine of Foote Mineral Co.

Tramp metal, such as manganese steel dipper teeth, drill bits, castings, broken parts that cause damage to hammermills, pump liners and sizing screens, can be automatically detected by the RCA Metal Detector. Installed on your conveyor, it's always on the job, electronically probing out all kinds of tramp metal, both magnetic and non-magnetic. Wired to sound an alarm, spray-mark the metal area or stop the conveyor when trouble threatens, it prevents downtime and repairs from eating up profits, quickly pays for itself. Why not let us make a survey of your plant? Use coupon.

MARK OF RCA QUALITY

ELECTRONIC

METAL DETECTOR

RADIO CORPORATION of AMERICA
Dept. T-236, Building 15-1, Camden, N. J.
In Canada: RCA VICTOR Company Limited, Montreal

☐ Please send me complete information on RCA Metal Detector for use in quarrying and mining.
☐ Have RCA field representative contact me.

NAME_____ TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

About 150 distributors, suppliers, and company officials gathered from all parts of the United States and Canada for a 2-day sales conference, which also celebrated the 40th anniversary of the Anthony Company, Streator, Ill.

Ninety percent of all company distributors were present at this sales conference, the first meeting of its size ever held by Anthony. Seven distributors were elected to a newly-formed Distributor Advisory Board. This group will meet several times a year with company management officials to discuss marketing and distributor problems.

Pictured above is W. C. Hayes, advertising manager of Anthony, awarding prizes to the winners of the "Name the New Products" contest. They are Bill Black Jr., Jersey City, N. J.; Don C. Platt, Chicago, Ill.; Jim Kelly, Chicago; T. L. Smith, Detroit, Mich.; and Jim Park, Chicago.

The Kennedy-Van Saun Manufacturing & Engineering Corp., New York. N. Y., has opened its new comprehensive research and development laboratory for conducting all types of experiments and test runs in manufacturing cement, lime, etc.

The new facilities are comprised of a Test Pilot Plant and a completely equipped chemical laboratory. Located at the company's manufacturing plant at Danville, Pa., the laboratory is available to KVS industry customers throughout the world.

Five new dealers have been appointed to sell and service the *Michigan* line of tractor shovels and excavator cranes, products of the Construction Machinery Division of the Clark Equipment Company, Benton Harbor, Mich.

Interstate Equipment and Supplies Co., Inc., P.O. Box 98, 280 River St., Montpelier, Vt., will handle the *Michigan* line in the entire state of Vermont.

Graid Equipment Co., North Wells Ave. at Fifth St., Reno, Nev., will cover the entire state of Nevada and the California counties of Modoc, Lassen, the eastern slope of Plumas, Sierra, Nevada, Placer, El Dorado, Alpine, and part of Inyo county.

Cramer Machinery Co., 1140 S.E. 7th St., Portland, Oreg., has as its territory the entire state of Oregon with the exception of Wallowa, Union, Baker, and Malheur counties, and the Washington counties of Wahkiakum, Cowlitz, Clark, Skamania, Klickitat, and part of Pacific.

All Mississippi counties south of and including Issaquena, Sharkey, Washington, Humphreys, Holmes, Attala, Winston, and Noxubee will be covered by Equipment Incorporated, P.O. Box 1987, Highway 80 West, Jackson, Miss.

Construction Equipment Co., Ltd., 661 Wall St., Winnipeg, Man., Can., has as its territory the entire province of Manitoba.

In carrier landings, planes coming in at more than 100 knots are stopped in a split second. This amazing performance is made possible by having each plane hook onto one of several wire ropes stretched across the flight deck. Both plane and rope receive an almost unbelievable shock at the moment of contact. Needless to say, only top-quality wire ropes can be used for this application because . . .

you can't bargain with safety

While your use of wire rope differs from this carrier application, *safety should be just as important to you.* For, although a "bargain" rope may save you money, it can cost you your peace of mind. So don't bargain with safety. Buy a rope that's a *quality* rope—buy Wickwire Rope. 5049

WICKWIRE ROPE — A CF&I PRODUCT

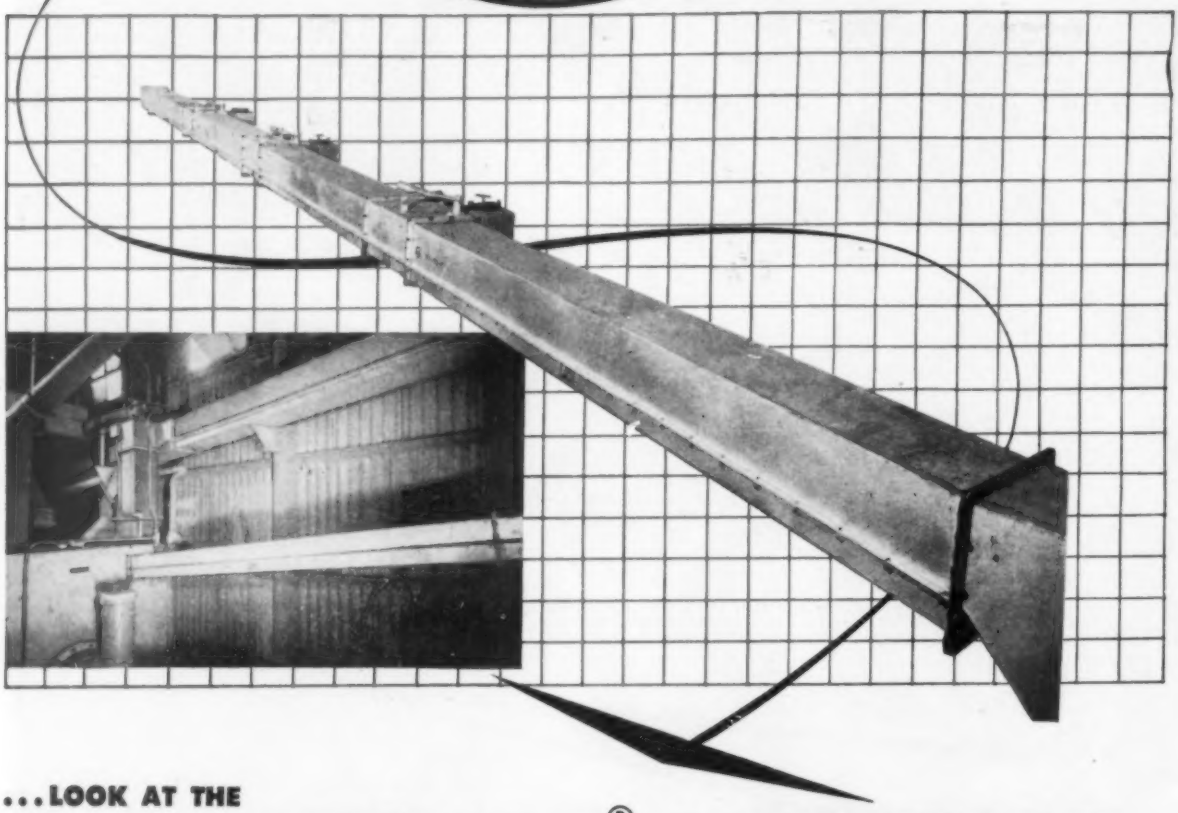
CF&I

LOOK FOR THE YELLOW TRIANGLE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
New York • Philadelphia

HOW TO SHY AWAY FROM HIGH CONVEYING COSTS



...LOOK AT THE

F-H AIRSLIDE® CONVEYOR

AND ITS RECORD OF SUCCESS

The simplicity and noiseless ease with which the F-H Airslide fluidizing conveyor conveys alumina, phosphate, cement, flour, filler dust, and many other dry, fine materials are being enjoyed in a great number of plants in many industries.

The Airslide's record for low maintenance, high-volume conveying is outstanding wherever it is used . . . benefits in operation and in maintenance are constant and substantial.

In operation, low-pressure air is introduced into the material, through a porous fabric, from a lower section, causing the material to literally flow in a fluidized state through the upper section of the Airslide, installed on an incline, the degree of slope depending upon the material to be conveyed.

The Airslide can be used singly or in combination with other Fuller air-conveying systems, such as the Airveyor® or Fuller-Kinyon system.

If your operation involves the conveying of dry, fine material, take the simple step of consulting Fuller. Fuller engineers can show you, as they have others, how the F-H Airslide can "carry the load" in a way you never thought possible. For details of the Airslide write us for descriptive literature.

FULLER COMPANY 100 Bridge St., Catasauqua, Pa.

A SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORP.

Chicago • San Francisco • Los Angeles • Seattle • Kansas City • Birmingham

FH-63
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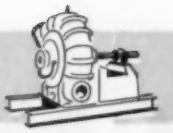
Fuller

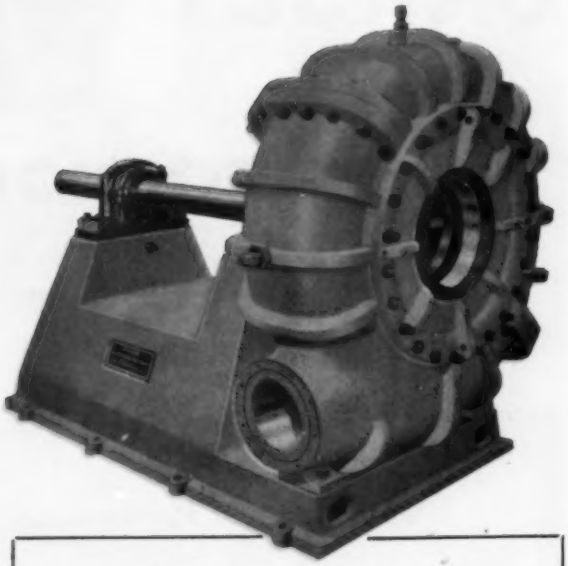
. . . . pioneers in harnessing AIR

Another Customer Speaks



After Nearly

THREE YEARS—



After nearly three years' operation and several hundred thousand tons of sand production—STILL NO MAJOR REPAIRS required by this small (6″ discharge) Thomas DURABLE Dredge Pump in Virginia.

This is another addition to that long and growing list of satisfied users of Thomas DURABLE DREDGE PUMPS—profited users—who again and again are proving a truth that has become an axiom:

"You cannot buy at any price, a more durable pump for sand and gravel, than a THOMAS—you CANNOT BUY another pump that will make you as much money".

The reason, we repeat, is—

1. **Dependable, GENUINE Thomas Ni-Hard in all wearing parts.**
2. **Good and efficient design to complement the metal.**

Note in the letter reproduced here the facts from another prominent sand and gravel producer.

J. C. JONES SAND COMPANY, Inc.

WHOLESALE DEALERS IN

CONCRETE SAND
BUILDING SAND
FILLING SAND
ENGINE and MOTOR SAND
MACHINE DRIED SAND

ALL GRADES OF SAND

OFFICE
Phone MA 7-3307
6300 TIDEWATER DRIVE
Norfolk, Va.

Thomas Foundries, Inc.
P. O. Box 1111
Birmingham, Alabama

Gentlemen:

Our Thomas DURABLE Dredge Pump, Series "FL" (6"), was put into operation on May 14, 1954. It replaced a conventional pump that had given us considerable trouble. We asked that you inspect the pump and you did so on September 17, 1955 after more than a year's service.

At that time the pump had produced more than 115,000 tons of sand and it had needed no repairs. We were surprised that it showed so little wear.

On February 8, 1957 your representative again came by and removed the suction side cover to see how much wear had taken place. That inspection indicates that several more months will pass before any wearing parts are needed.

We are frank to admit that when we installed the pump in 1954 we doubted the wearing parts would last one year. Instead they have lasted nearly three times that long and we are certainly well pleased with it. Our only regret is that we did not sooner realize the economies obtainable from the DURABLE Thomas Pump.

Yours very truly,

A. A. Forbes
Asst. Manager

SAF/b

THOMAS PUMPS
available in sizes
6″ through 16″.

THOMAS FOUNDRIES, *Inc.*

P.O. BOX 1111 . . . . BIRMINGHAM, ALABAMA

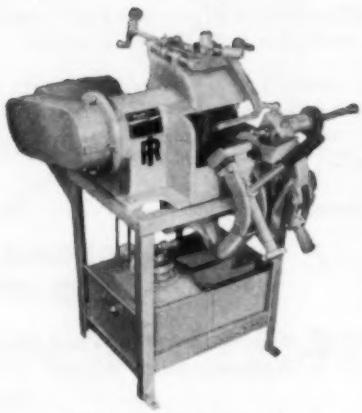
CARSET JACKBITS

are PRECISION MADE

for HIGHEST PERFORMANCE

Maintain That Performance
by resharpening with
the NEW JC-3 JACKBIT GRINDER

- Grinds cutting faces to precisely correct profile for maximum drilling efficiency.
- Grinds bit gage to proper clearance.
- Eliminates waste of over-grinding.
- Greatly multiplies operator output.
- Available with electric, air or gasoline engine drive.



JC-3 Electric Drive Grinder

TO MAINTAIN the unequalled drilling speed of a NEW Ingersoll-Rand Carset Jackbit—and get maximum feet of hole from each bit — resharpening should be done to close tolerances and without unnecessary waste of the cutting material.

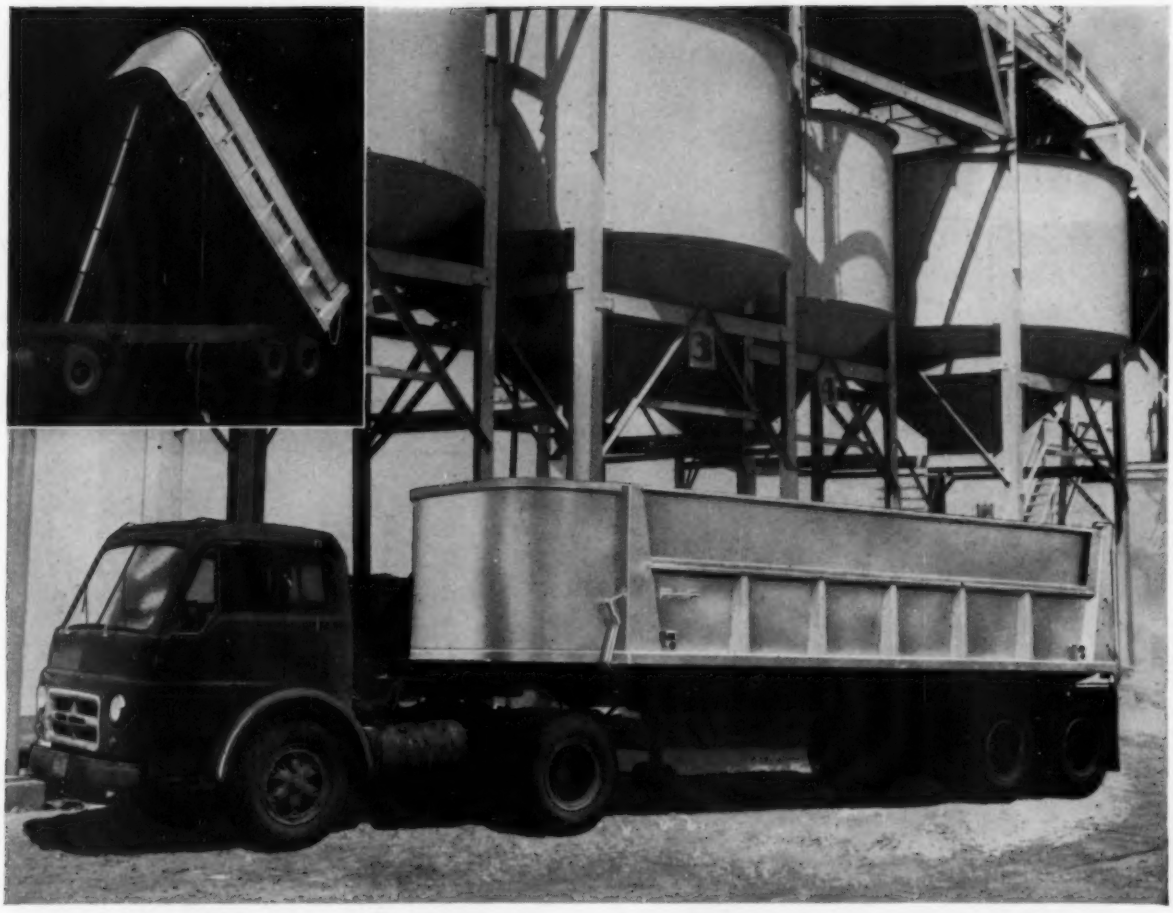
All of these requirements are met to excellent advantage with the new JC-3 Jackbit grinder — far more quickly, easily and accurately than by hand grinding methods. Ask your I-R representative for complete information on this time-saving, cost-saving machine. Or send for a copy of Bulletin 4187.

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

COMPRESSORS • TURBO-BLOWERS • ROCK DRILLS
AIR TOOLS • CENTRIFUGAL PUMPS • CONDENSERS
GAS AND DIESEL ENGINES

15-518



Model STMF, with Uni-scopic hoist and 26 ft., 30 cu. yd. body is ideal for economical bulk hauling. Galion design saves weight . . . hoist, body and chassis form closed triangle for maximum stability when dumping.

GALION TRAILER DUMPS

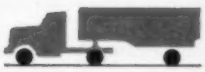
haul more . . . earn more with every load!

There's a model in Galion's trailer dump line *exactly* suited to your loads and the axle weight limitations in your locality. You'll find that you can select a Galion trailer dump custom-engineered for ideal weight distribution on *your* job . . . one that will enable you to haul extra profit-making payloads *legally*.

And, Galions are safer, too! They provide unexcelled stability, both on the highway and when dumping. All wheels remain on the ground as the body raises . . . stresses are evenly distributed throughout the running gear. What's more, Galion's lightweight yet rigid body-hoist-chassis combination eliminates twisting — a common cause of dumping upsets!

Your Galion distributor offers a full choice of trailer dump body, hoist, chassis and running gear types and capacities. Ask him to show you how you can haul more . . . earn more with Galions.

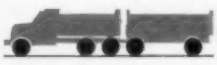
AA-5468



MODEL SSM — Best where local weight laws allow high individual axle weight limits, but relatively low gross weight limit.

MODEL STM — For use where weight laws allow credit for only one set of tandem axles, with medium gross weight limit.

MODEL TTM — Used in those areas where highway weight limit laws allow maximum credit for two sets of tandem axles.

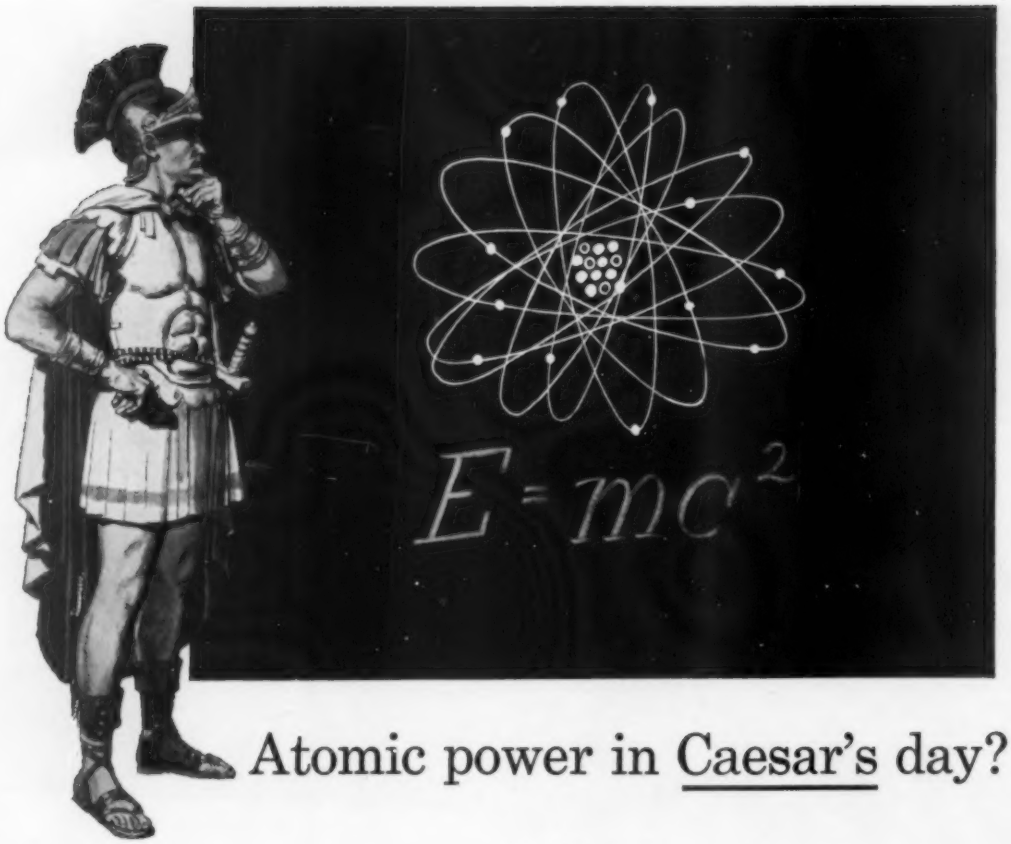


MODEL HH — Ideal where laws permit "trains" and require maximum axle spacing for greatest gross weight allowance.

UNI-SCOPIC

more payload . . . more profits with Galion!

GALION ALLSTEEL BODY COMPANY • GALION, OHIO



Atomic power in Caesar's day?

Certainly!

It was there, in the ground, in the air and water. It always had been. There are no more "raw materials" today than there were when Rome ruled the world.

The only thing new is knowledge . . . knowledge of how to get at and rearrange raw materials. Every invention of modern times was "available" to Rameses, Caesar, Charlemagne.

In this sense, then, we have available *today* in existing raw materials the inventions that can make our lives longer, happier, and inconceivably easier. We need only *knowledge* to bring them into reality.

Could there possibly be a better argument for the strengthening of our *sources* of knowledge—our colleges and universities? Can we possibly deny that the welfare, progress—indeed the very *fate*—of our nation depends on the quality of knowledge generated and transmitted by these institutions of higher learning?

It is almost unbelievable that a society such as ours, which has profited so vastly from an accelerated accumulation of knowledge, should allow anything to threaten the wellsprings of our learning.

Yet this is the case

The crisis that confronts our colleges today threatens to weaken seriously their ability to produce the kind of graduates who can assimilate and carry forward our rich heritage of learning.

The crisis is composed of several elements: a salary scale that is driving away from teaching the kind of mind *most qualified* to teach; overcrowded classrooms; and a mounting pressure for enrollment that will *double* by 1967.

In a very real sense our personal and national progress depends on our colleges. They *must* have our aid.

Help the colleges or universities of your choice. Help them plan for stronger faculties and expansion. The returns will be greater than you think.

If you want to know what the college crisis means to you, write for a free booklet to: HIGHER EDUCATION, Box 36, Times Square Station, New York 36, New York.

HIGHER EDUCATION

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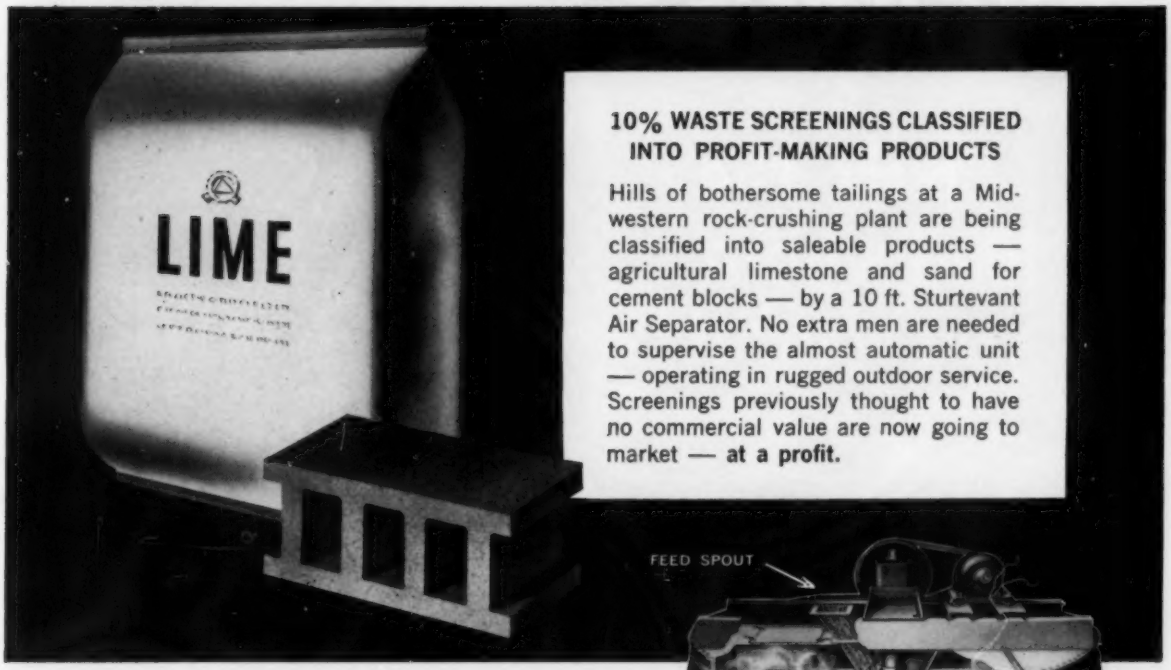
Tailings Go to Market - Separated by Sturtevant



10% WASTE SCREENINGS CLASSIFIED INTO PROFIT-MAKING PRODUCTS

Hills of bothersome tailings at a Mid-western rock-crushing plant are being classified into saleable products — agricultural limestone and sand for cement blocks — by a 10 ft. Sturtevant Air Separator. No extra men are needed to supervise the almost automatic unit — operating in rugged outdoor service. Screenings previously thought to have no commercial value are now going to market — **at a profit.**

THE SEPARATOR THAT UPPED 40 TO 400 MESH OUTPUT AS MUCH AS 300%

Sturtevant Air Separators range from 3 to 18 ft. in diameter: deliver fines from 40 to 400 mesh at rates as high as 65 tons per hour . . . in the cement industry, have a tested record of increasing mill capacities from 25 to 300% while lowering power consumption as much as 50% — when used in closed circuit with grinding mills.

Designed to cut costs and build profits, Sturtevant Air Separators give a lifetime of high-efficiency, low down-time service. Rugged construction plus easy accessibility for quick maintenance (typified by the "Open-Door" design in other Sturtevant equipment) assure more output per machine year.

Write today describing your problem. Please include information on material, process and desired capacity.

Address: Sturtevant Mill Company,
104 Clayton St., Boston 22, Mass.

What Can a Sturtevant Air Separator Do in Your Pulverizer System?

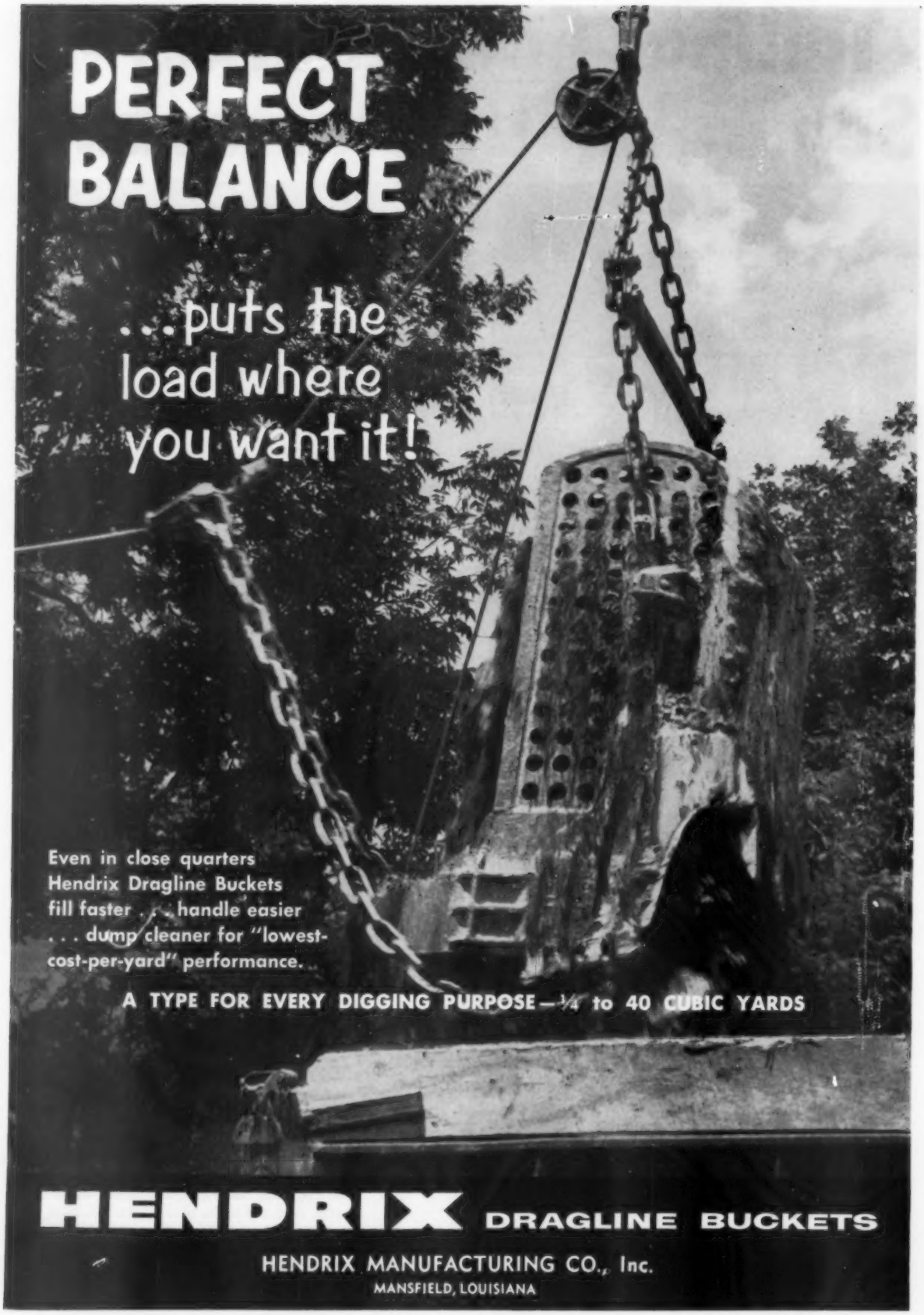
Controlled centrifugal whirl by balancing forces separates rapidly, efficiently, cement, lime, clay, talc, ceramics, refractories, phosphates, coal and many other materials. Also used for selection of pigments, limestone, fillers, plastics, oyster shells and abrasives. Write for Sturtevant Bulletin No. 087.

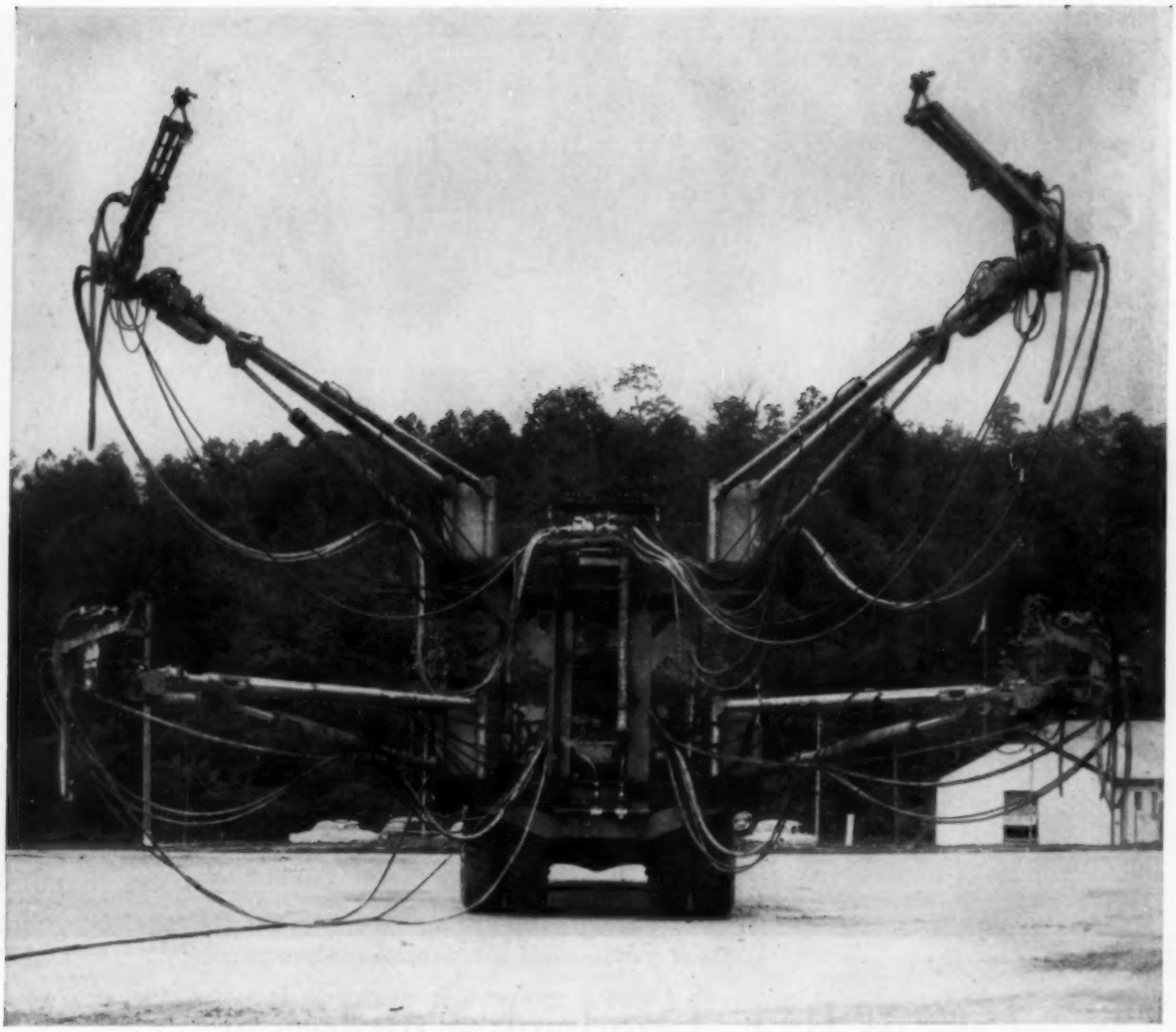
STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS


PERFECT BALANCE
...puts the load where you want it!
Even in close quarters Hendrix Dragline Buckets fill faster . . . handle easier . . . dump cleaner for "lowest-cost-per-yard" performance.
A TYPE FOR EVERY DIGGING PURPOSE—¼ to 40 CUBIC YARDS
HENDRIX DRAGLINE BUCKETS
HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA



Head-on view of a 4-boom jumbo. Note wide reach of the Gardner-Denver hydraulic booms.

Build your own jumbo with
GARDNER-DENVER COMPONENTS

Tailor your truck, tractor or rail mounted jumbo with Gardner-Denver booms, feeds and drills. You get just what you need for each dollar invested. Gardner-Denver offers a wide selection in:

- **HYDRAULIC BOOMS,** completely automatic and remotely controlled for mounting on your jumbo.
- Manufactured in two sizes and types (tunnel and rugged types), TRIPODS for mounting heavier drifter equipment with the longer chain feed.
- **POWERFUL ROCK DRILLS** in 3-, 3½-, 4 and 4½-inch sizes. Long chain or screw feed mountings.
- **SECTIONAL DRILL RODS** and couplings for long-hole drilling. Gardner-Denver Ring Seal Shank.
- **REMOTE CONTROLS** located at any point along the boom or on the jumbo chassis. With G-D Remote Controls, one operator moves booms into position and controls complete drilling operation without leaving his station.

Gardner-Denver engineers will work with your staff and powderman to design your jumbo to the job.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

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JOHN L. COLLYER

Portrait by Fabian Bachrach

"75% of B. F. Goodrich Employees... Save $9,000,000 Per Year"

"B. F. Goodrich people are proud of their many years of participation in the Payroll Savings Plan. 75% of our employees are members of the Plan, with payroll deductions of $9,000,000 a year.

"Thrift is one of the keys to our continued prosperity. It builds security for the family, retards inflation and stabilizes the purchasing power of the dollar. I am proud that Ohio is a leader in this worthwhile endeavor and that it has been my privilege to serve since 1950 as State Chairman of the Payroll Savings Advisory Committee."

JOHN L. COLLYER, ***Chairman***
The B. F. Goodrich Company

A simple person-to-person canvass that puts a Payroll Savings Application Blank in the hands of *every* employee is all you have to do to install the Payroll Savings Plan or build employee participation in your present plan. Your State Sales Director is ready to help you. Write today to Savings Bond Division, U. S. Treasury Department, Washington 25, D. C.

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BETTER FRAGMENTATION with Spencer Prilled Ammonium Nitrate now permits stripping units to move up to 25% more material. Read below why Spencer Prills are superior to other types of nitrate solids!

Cut Blasting Costs 50% with Spencer Prilled Ammonium Nitrate

Independent laboratory tests prove that porous structure of Spencer product develops more effective and higher speed blast.

Because ingredients cost less, and the mixing process is so much simpler, blasting costs can be cut up to 50% by using Spencer Prilled Ammonium Nitrate. At the same time, this product produces better fragmentation, yielding up to 25% more material.

The basic ingredient is Spencer Prilled Ammonium Nitrate. Impartial laboratory tests have now proved that the porous structure of these prills makes them the most effective and highest-speed blasting agent of any manufactured nitrate solid. This conclusion has been further verified by extensive field tests.

More even distribution made possible by the prills is one important reason for the superiority of Spencer Prilled Ammonium Nitrate. And, since the deflagration of a solid explosive is layer by layer from the surface of the particle, the additional surface available on the prill speeds up decomposition.

Contrary to popular opinion, the lesser bulk density of prilled ammonium nitrate actually *increases* rather than decreases the energy of the explosion. This fact is verified, not only by such an authority as the ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY, but also by comparative field tests. And more intense explosion means better fragmentation.

Not explosive in its normal form, Spencer Prilled Ammonium Nitrate can be handled safely, and because the mixing operation is so simple and safe, it can be done right at the mine location.

As supplier of the original nitrate used in the early stages of developing the Akremite Blasting Process, Spencer Chemical Company has been closely associated from the very beginning with this project to create less expensive blasting techniques.

For more specific information about low-cost blasting for coal, iron, limestone or construction, write to Spencer Chemical Company. We will be glad to supply you with any needed technical assistance or service.

SPENCER CHEMICAL COMPANY

610 Dwight Bldg. • Kansas City 5, Mo. BAltimore 1-6600

WEMCO MOBIL-MILL Heavy Media Separation Plant

Save $1.00 or more per yard of concrete

where aggregate requires HMS treatment

If you *sell* aggregate: WEMCO **HMS** will give you a better market, especially where specifications are tight.

If you *buy* aggregate: WEMCO **HMS** will lower your cost of producing better concrete by more than $1.00 per yard.

If you *specify* aggregate: WEMCO **HMS** can give concrete of greater strength and durability, as proved by state tests.

Below are the facts – composite figures based on actual operating results – demonstrating a saving of over a dollar per yard of finished concrete, using WEMCO **HMS** treated aggregate. Operating costs for WEMCO **HMS** are low – only a fraction of the actual dollars-and-cents benefits you'll obtain. Check with your WEMCO representative today, or write for details.

Untreated Aggregate	Cement (6-bag mix required for durability)	$6.00
	Pozzolan (required by most state specifications)	$1.08
	Total concrete cost per yard	$7.08
WEMCO HMS Aggregate	Cement (5-bag mix provides sufficient durability)	$5.00
	Pozzolan (less is needed to meet specifications)	$ .91
	Total concrete cost per yard	$5.91
Saving	– in cement and pozzolan alone – per yard	$1.17

WEMCO

WESTERN MACHINERY COMPANY
650 FIFTH STREET
SAN FRANCISCO 7, CALIFORNIA

30 years of LORAIN performance—

now the 6th LORAIN for

Batesville White Lime Co. bought their first Lorain shovel just 30 years ago. Recently they bought their 6th Lorain, shown here. This 1½-yd. Lorain-72 rock shovel gives them — and can give you, too — benefits of many modern Lorain features that will keep it going year after year in this tough digging operation. Here are some of them:

Full, "Metered-Air" controls for the easiest, smoothest, fastest operation . . . Torque Converter power take-off to keep full power at the dipper teeth at all times, to eliminate stalling, to adjust torque automatically to digging needs . . . time-saving air dipper trip and many more.

Successful quarries don't repeat on Lorains decade after decade without a record of their profitable operations. It will pay for you to check the Lorain line with your nearby Thew-Lorain Distributor. Let him show you Lorains in operation up to 2½ yards in other quarries in your area. Why not see him soon.

THE THEW SHOVEL CO., Lorain, Ohio

THEW LORAIN®

Hendrick, Pioneer Perforator of special quality steels for over 81 years, can really cure your vibrating screen problems! Hendrick's wide experience in selecting and specifying the best analysis of steel for the aggregates industry plus their unlimited experience in perforating plate gives you a combination **1+1=2** that can't be beaten! Hendrick Perforated Plate not only stands up longer, but affords more accurate sizing. No other screening medium can compare to it for maintained uniformity of mesh, for non-blinding clearance and for long trouble-free life. For details write to Hendrick, today!

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Hendrick MANUFACTURING COMPANY
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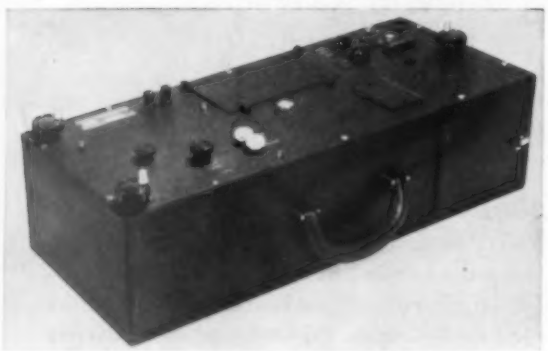
NEW! . . . Portable
BLAST and VIBRATION SEISMOGRAPH
by Sprengnether



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*Rugged-Dependable
*Custom Designed to the User's Requirements

Entire instrument is self-contained in rigid aluminum case -25 x 10 x 8 inches Uses basic seismometer system. The three components are adjusted to 0.75 second. Timing lines are placed across record at 0.02 second. Instrument operates to give accurate record of displacement of ground as vibrations pass recording site. Interpretation service available by engineering seismologists.

Send for Free Data Folder.

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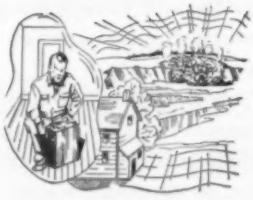

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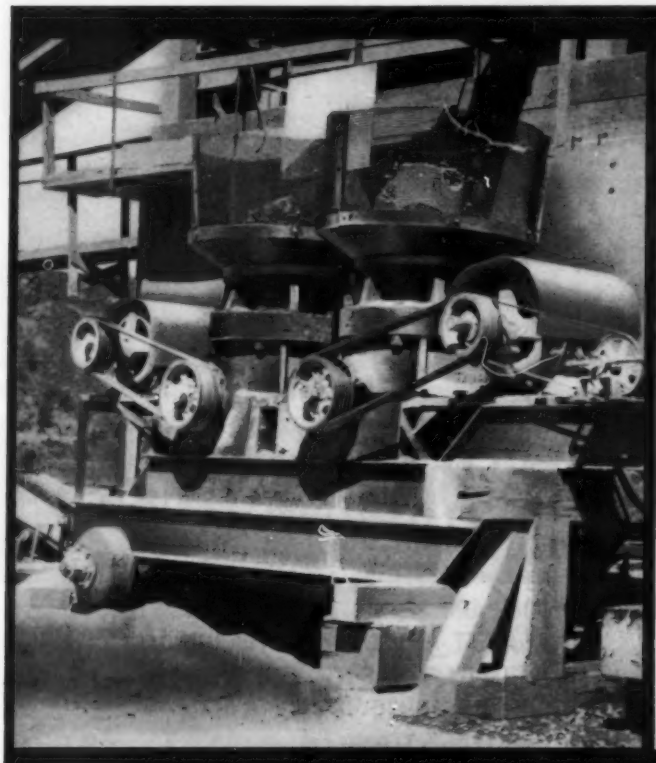
WRITE FOR OUR DESCRIPTIVE BROCHURE

THE VIBRATION ENGINEERING CO. (Inc.)
301 Hazleton Nat'l Bank Bldg., Hazleton, Pa.

the expert fisherman
has his rod custom-made
because he gets
something **EXTRA**



the profit-wise operator

BUYS TRAYLOR REDUCTION CRUSHERS for the same reason

Traylor Reduction Crushers are famous throughout the industry for the extra *production* and extra *profits* they put into rock crushing operations. Traylor-made in ten sizes, with feed openings from 1½″ to 22″, Traylor Reduction Crushers provide capacities up to 590 tons per hour. For complete specifications write for Traylor Bulletin No. 8112 and Bulletin No. 127.

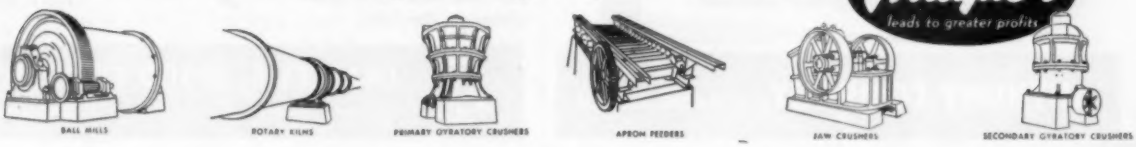
TRAYLOR ENGINEERING & MFG. CO.
955 MILL ST., ALLENTOWN, PA.
Sales Offices: New York—Chicago—San Francisco
Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P.Q.

the experts agree . . . there's nothing like

TRAYLOR-MADE

equipment for peak performance

A Traylor leads to greater profits



"This Anthony Trailer carries two extra tons every time it leaves the quarry

. . . and outhauls any six-wheeler I'm familiar with."

A. J. Jalovec, Sr.
A & J CARTAGE
5953 Archer Road, Argo, Ill.

Like you, Mr. Jalovec likes to see fixed job costs go down. Every two tons of *extra* legal payload he hauls with his Anthony Trailers means less time per job. Because this frameless dump body is lighter for its load capacity, gas and oil costs are also cut. Mr. Jalovec says maintenance on this dump body is "nil" . . . Anthony distributor service is "wonderful".

A & J Cartage generally uses this Frameless Trailer to haul 30,000 pounds of payload from the quarries to ready-mix batch plants. There, his drivers dump right into the hoppers.

The hoist is in an extreme forward position with much of its weight up front. That's why Mr. Jalovec can haul more legal payload on the important rear axle.

To cut costs on your jobs, check into the long list of Anthony Teleramic Hoist and Dump Body models. One is tailored to suit your particular operation.

Buy The Dump Body That Has The Service

Over 100 Anthony Distributors are located nationwide. At least one is convenient to you . . . ready to give immediate service on all Anthony equipment. Complete descriptive literature is now available on Anthony Frameless Dump Trailers and Teleramic Hoists. No obligation, of course!

The Teleramic "V" Seal Hoist Is A Major Factor In Frameless Trailer Success

Proven "V" seal packing is only one of many quality features in the Teleramic Hoist design. Because the dry operating "V" seal is self-adjusting, repacking or manual adjustment of the Teleramic cylinder is very rarely needed. "Truss rings" encircle and reinforce the ends of each cylinder tube to prevent "flaring". Extra long bronze bearings and long overlap of the cylinders help keep them perfectly aligned.

WRITE: 1755 Baker Street

ANTHONY COMPANY, STREATOR, ILLINOIS

H & L Teeth that really dig!

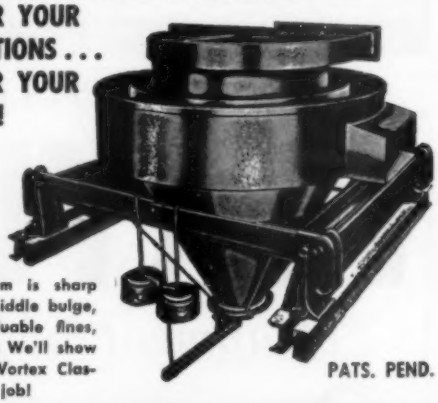
H & L TOOTH COMPANY

1540 South Greenwood Avenue Montebello, California

AUTO VORTEX CLASSIFIERS...

MOST EFFICIENT BY ANY MEASURE FOR SINGLE OR MULTIPLE SPLITS!

COMPARE RESULTS . . . COMPARE COSTS . . . AGAINST ANY OTHER SAND GRADATION EQUIPMENT! AFTER SUCH COMPARISON, YOU, TOO, WILL BUY AUTO-VORTEX CLASSIFIERS . . . WHATEVER YOUR SPECIFICATIONS . . . WHATEVER YOUR PROBLEMS!



If your problem is sharp splits, excess middle bulge, or loss of valuable fines, write us today! We'll show you how Auto-Vortex Classifiers do the job!

PATS. PEND.

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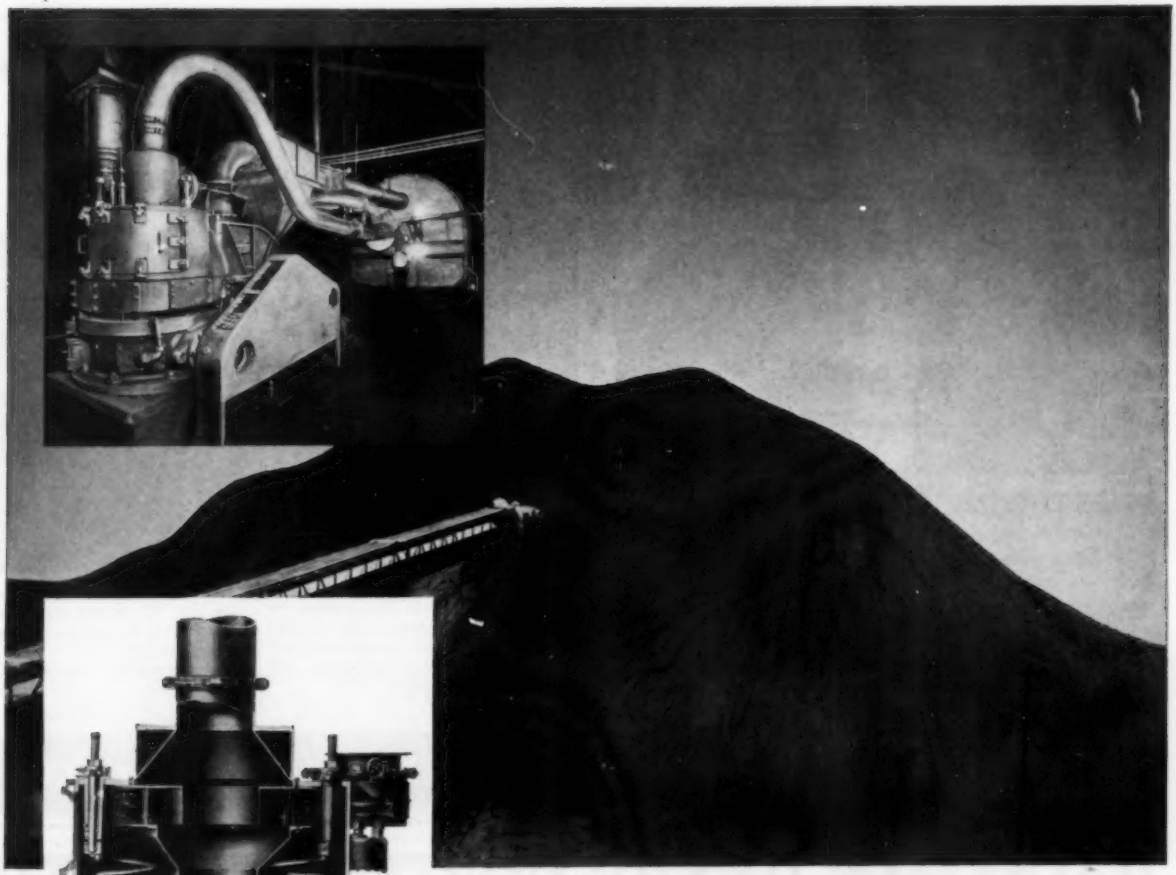

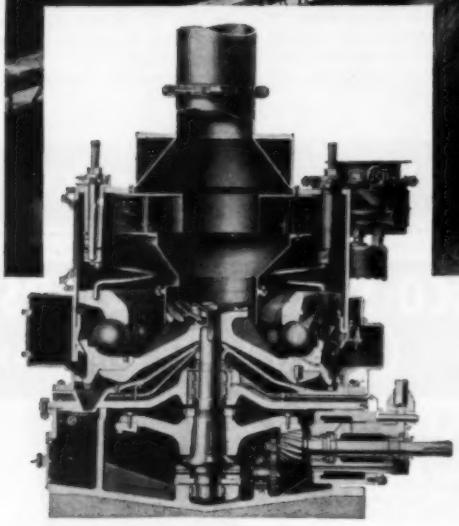

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...B&W Type EL Pulverizers

Wherever these "extended engagement" pulverizers are used for direct-firing of rotary kilns they have established long and impressive performance records.

BECAUSE:

1. Grinding zone has no bearings or parts to be lubricated.
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BOILER DIVISION

C-212

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Earth Mover Tire Recapping Service
CUTS COSTS PER MILE AND PER TON

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ELIMINATE *Costly* SCREEN BLINDNESS

PUT ON THE HEAT FOR GREATER TONNAGE

- **EASILY ADAPTED** quick change assemblies assure fast screen changes, save valuable man hours.
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- **LESS SHUT-DOWN TIME** for replacement of worn screens.

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(See Our New Descriptive Folder No. 756)

HANCO Electric Screen Heaters convert any volt or cycle current from plant power lines into low-cost, low-voltage current, delivered through high amperage cables and copper distribution bars to the screen cloth. Heat generated in the screen wires makes "clogging" and "blinding" impossible.

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CROSS Perforated Steel Sections and Decks for VIBRATING — SHAKING — REVOLVING SCREENS

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Connection of MOTORITE to engine is by means of interchangeable adapters replacing the fuel injector in the cylinder. "Universal" adapter illustrated at left is adjustable for use on more than 100 popular makes and models of Diesels. Additional adapters are available from stock for all Diesel engines listed at right. For other Diesel engines special adapters are made to order.

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Indispensable for servicing busses, trucks, farm tractors, contractors' machinery, drilling rigs and other mobile Diesel-powered equipment.

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Experienced Chief Engineer required by Canadian Cement Company. Thorough knowledge of design and operation of cement plants necessary. Age 30 to 50 years. Attractive position in a progressive company.

Send application to:

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CHIEF ENGINEER

Permanent position with excellent future and good salary for college graduate mechanical or mining engineer, age up to 45, with several years of successful experience in the design and application of crushers and all other types of aggregate production machinery and with engineering department administrative experience. Location mid-west city with very good living conditions. Give age, complete outline of education and experience. State salary expected and enclose recent photo. Replies kept confidential.

Box PQ-6053, c/o PIT & QUARRY PUBLICATIONS
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HELP WANTED

Quarry operator in New York metropolitan area desires retired specialist for planning and consultation. Reply to Box No. PQ-4023 stating qualifications, salary, and so forth.

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WANTED

An experienced superintendent to take complete charge of a limestone quarry operation in northwestern city. The position requires a man who can handle all phases of production, sales and promotion.

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Permanent Position.
Salaried.

Eastern territory. Selling patented feeders and crushing equipment to industrial accounts.

Submit Qualifications:

Write to:

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Plant Superintendent for Sand & Gravel Producer. Dredge operation and shipping facilities. State starting salary and experience.

Reply to:
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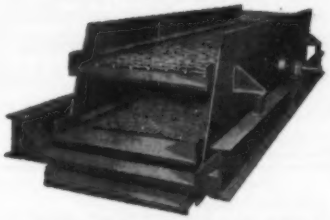
IMMEDIATE SHIPMENT FROM OUR FACTORY - WRITE, WIRE OR PHONE

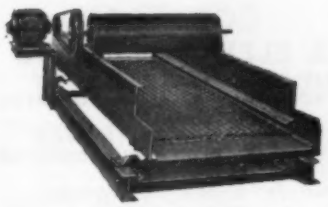
NEW BONDED® HEAVY DUTY VIBRATING SCREENS



HEAVY DUTY MODELS, TYPE BS: Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. Write for New 8-page Bulletin No. 1087.

Model Number	No. of Decks	Screening Area	Sale Price
124AS	1	2'x4'	$ 443.00
224AS	2	2'x4'	472.00
126AS	1	2'x6'	472.00
226AS	2	2'x6'	501.00
136AS	1	3'x6'	581.00
236AS	2	3'x6'	888.00
336AS	3	3'x6'	956.00
138AS	1	3'x8'	675.00
238AS	2	3'x8'	815.00
338AS	3	3'x8'	996.00
336BS	3	3'x6'	1303.00
436BS	4	3'x6'	1447.00
138BS	1	3'x8'	1231.00
238BS	2	3'x8'	1282.00
338BS	3	3'x8'	1375.00
248BS	2	4'x8'	1865.00
348BS	3	4'x8'	2035.00
2410BS	2	4'x10'	1953.00
3410BS	3	4'x10'	2305.00
2412BS	2	4'x12'	2319.00
3412BS	3	4'x12'	2635.00
4412BS	4	4'x12'	2833.00

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



GENERAL DUTY SCREENS, TYPE AS: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for New 8-page Bulletin No. 1086.

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals, including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

Conveyor Prices Include Belting

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1088
16"	60'	2662	1359
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4052	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1816	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

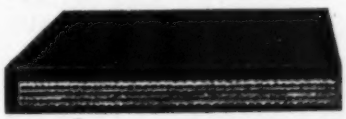
For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting. Write for Bulletin 1138.

For 14" belt	$16.84 per foot
For 16" belt	18.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

BONDED TROUGHING IDLER CONVEYORS ARE ALSO AVAILABLE WITH TRUSS TYPE CONSTRUCTION. WRITE FOR DESCRIPTIVE INFORMATION AND PRICES.

NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck ⅛" top rubber cover by 1/32" bottom cover 12# to 15# average friction pull; 800# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



Width	Ply	List Price	Sale Price
14"	4	$3.52 foot	$2.83 foot
16"	4	3.96 foot	2.97 foot
18"	4	4.38 foot	3.29 foot
20"	4	4.83 foot	3.80 foot
24"	4	5.68 foot	4.26 foot
30"	4	6.97 foot	5.21 foot
36"	4	8.26 foot	6.18 foot

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting. This belt is for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

Width	Ply	List Price	Sale Price
16"	4	$4.71 foot	$3.46 foot
18"	4	5.23 foot	3.83 foot
20"	4	5.73 foot	4.37 foot
24"	4	6.74 foot	4.94 foot
30"	4	8.28 foot	6.07 foot
24"	5	7.90 foot	5.78 foot

The following belts are 5-ply, 32 oz. duck:

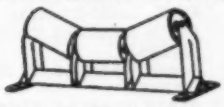
Width	Top Cover	Bottom Cover	List Price	Sale Price
24"	1/8"	1/16"	$ 8.56 foot	$ 6.42 foot
30"	1/8"	1/16"	10.52 foot	7.89 foot
36"	3/16"	1/16"	14.21 foot	10.66 foot

A heavier duty 28 oz. duck belt with ⅛" top rubber cover x 1/32" bottom rubber cover having 3500# to 4000# average cover tensile, 20# to 24# average friction pull. For the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

Width	Ply	List Price	Sale Price
18"	4	$5.67 foot	$4.20 foot
20"	4	6.22 foot	4.61 foot
24"	4	7.32 foot	5.41 foot
24"	5	8.53 foot	6.31 foot

Other widths, plies, duck weights and cover thicknesses available at low prices. Write for Free Sample.

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE

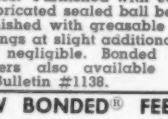


3-roll, 5" diameter Troughing Idlers for:			
14" belt	$16.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:			
14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well known makes. Furnished with easily replaceable pre-lubricated sealed ball bearings. Also, can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Bonded Rubber Disc Impact Idlers also available from $61.00. Write For Bulletin #1138.

NEW BONDED® FEEDERS



For high tonnage and controlled feed of Aggregate, Sand, Gravel, Crushed Stone, Clay products, Metallic Ores, Coal, Cinders and almost any other bulk material to Crushers, Screens, Conveyors, Mills and other process machinery. Feeder may also be driven from tail shaft of Bonded Troughing Idler Conveyors, thus eliminating the necessity of two motors. All models available in abrasion resistant alloy steel plate. Capacities to 250 tons per hour. Write for Bull. #1140 & #1182. Priced from $255.00

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Holdback $99.00

Return Belt Guide Idler $11.75

Head & Tail $149.00

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LATE MODEL VIBRATING SCREENS.
JAW CRUSHERS, ALL SIZES.
GEARMOTORS 3 to 15 H.P.

FOR SALE CONVEYOR & ELEVATOR PARTS

125'x60" USED CONVEYOR BELT.
92'x54" ALMOST NEW CONVEYOR BELT.
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57'x36" ALMOST NEW CONVEYOR BELT.
485'x24" ROUGH TOP PACKAGE BELT.
280'x14" ALMOST NEW CONVEYOR BELT.
433'x16" 7 PLY NEW ELEVATOR BELT.
225'x16" 6 PLY ALMOST NEW ELEV. BELT.
150'x12" ROUGH TOP USED BELT.
2000'—8" to 14" TRANSMISSION BELT, ALMOST NEW.
75—24" PLAIN BEARING TROUGH IDLERS.
130—30" PLAIN BEARING TROUGH IDLERS.
115—36" PLAIN BEARING TROUGH IDLERS.
83—42" ANTIFRICTION TROUGH IDLERS.

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Crushed stone quarry 100 miles south of San Francisco. App. 70 employees. Write, giving complete details of experience, education and salaries earned. Confidential.

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ROTARY DRYERS
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Good, Used Pit & Quarry Equipment

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1—F. L. SMIDTH ALL WELDED ROTARY KILN, 8' 2" x 132', COMPLETE WITH ALL AUXILIARY EQUIPMENT, 13 YRS. OLD.

1—VULCAN 6'6" x 100' ROTARY KILN, COMPLETE WITH AUXILIARY EQUIPMENT.

BOX PQ-6103 c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

WANTED

Industrial Portable Sand Plant in Kansas has opening for a man to assist Superintendent in operation and maintenance of plant machinery and equipment. Knowledge of conveyors, crushing equipment, sand pumps, bituminous sealing equipment and mechanical ability essential.

Give references, age and experience.

SAND INC.
1313 West 31st South
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WANTED

Hydraulic Dredge
Portable Steel Hull—10" x 10" or 10" x 8" Pump. Advise specifications, condition, location, price.

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FOR CASH
ESTABLISHED QUARRY AND CRUSHED STONE BUSINESS

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$35,000 of new Carbide Inserted Jackbits at substantial discount.

Address: JACKBITS
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JAW CRUSHERS—6" x 3" to 60" x 48"

Before buying or selling any
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BACON-PIETSCH Co., Inc.
Engineers & Manufacturers Send for Catalogue
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Machine Shop Facilities
FEEDERS
Conveyors, Screens, etc.

WANTED

Schaffer or Kritzer continuous lime hydrator—10 to 15 tons per hour capacity.
Also Raymond No. 1, 2 or 3 automatic pulverizer with integral whizzer separator.

BOX PQ-5063 c/o PIT & QUARRY PUBLICATIONS
431 S. Dearborn St. Chicago 5, Ill.

WANTED

36" conveyors any length, also idlers, returns and belting.
30" conveyors any length, also idlers, returns and belting.

WIVCHAR READY MIX CORP.
Box 461 Riverhead, N. Y.

WANTED

6 inch electric water pump.
Must be in A-1 condition.

RIEMER BROS. INC.
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GLadstone 5-6330

WANTED

One (1) cement Silo, 400 bbl. capacity plus. Complete with scales and weigh box, but no screw or elevator.

WIVCHAR READY MIX CORP.
Box 461 Riverhead, N. Y.

DRAGSCRAPER HOISTS

2—AMERICAN double-drum #2125 and #2130. 2-speed. Rated 5000# @ 600 FPM on rear drums and 12,000# @ 250 FPM on front drums. Units powered by 125 HP 3-ph. 60-cycle, 220-volt, slip-ring motor and controls and 150 HP 6-cyl. DFXE diesel engine. Approximately 20,000# each.

Excellent Condition

Priced at less than 50% of today's new price.

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P&H - Model 1600 - Electric Power Shovel, 400 HP P&H Motor and Generator, 2300 or 4160 volts, Dipper 6 yard. Caterpillar type. Separate motor for propelling only.

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Approximately 9″ x 12″ size

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36″ x 12′ apron feeder.
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Lorain TL25S ⅝-yard gas powered clamshell.
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3—Caterpillar DW-10 scrapers. Good.
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GMC, twin diesel. Rebuilt.
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MISCELLANEOUS

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Parsons	"21"	Ladder-type Crawler-Mounted Trenching Machine, digs 9′ deep.
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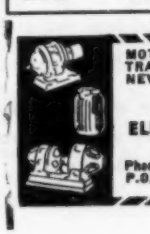

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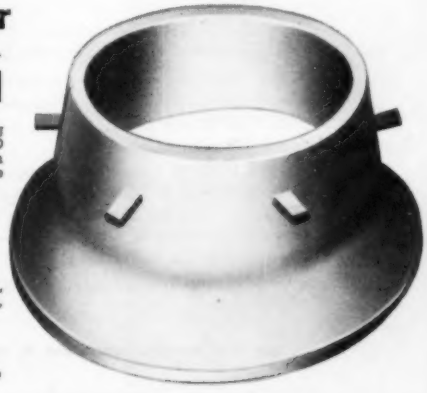

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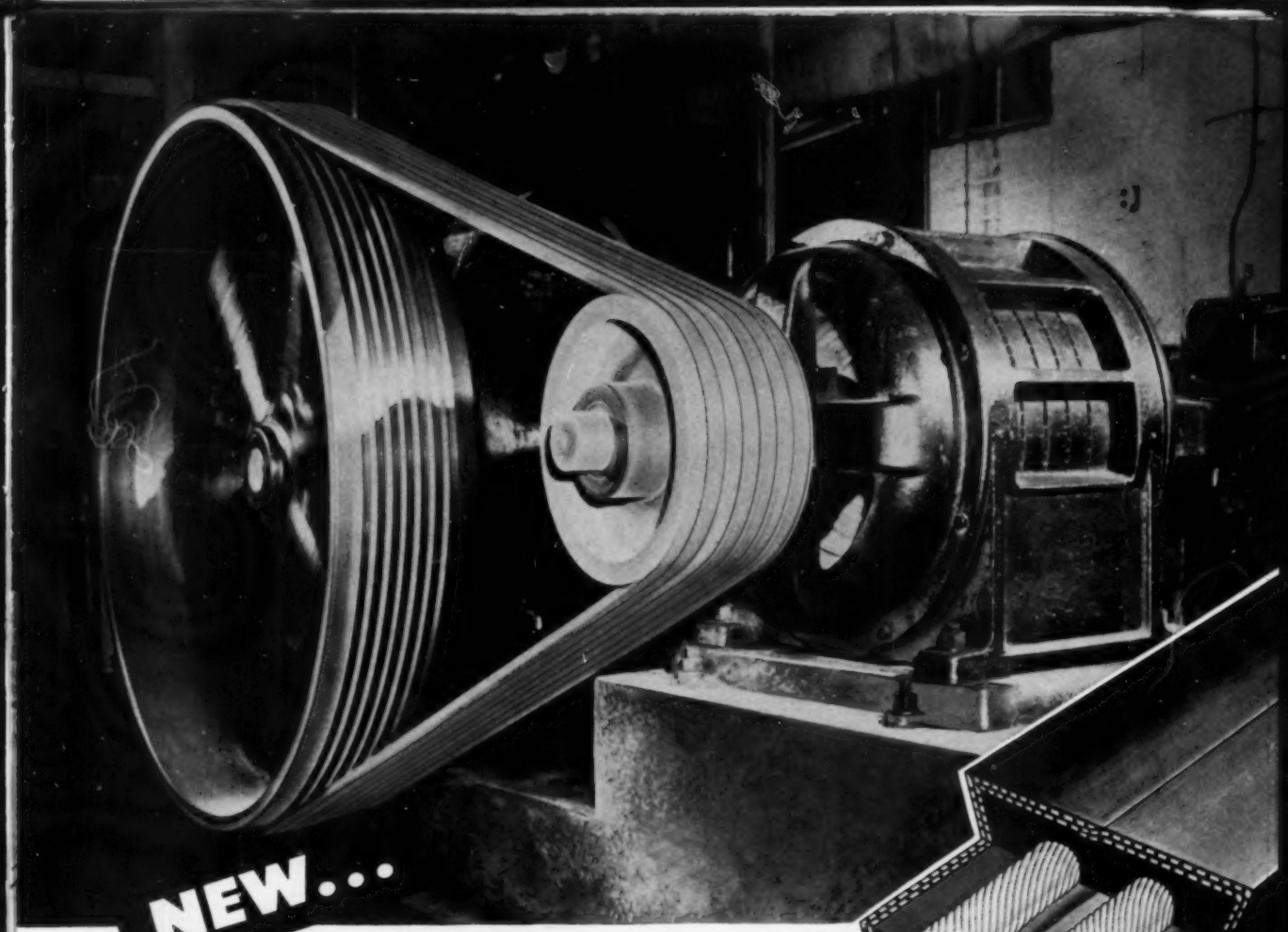

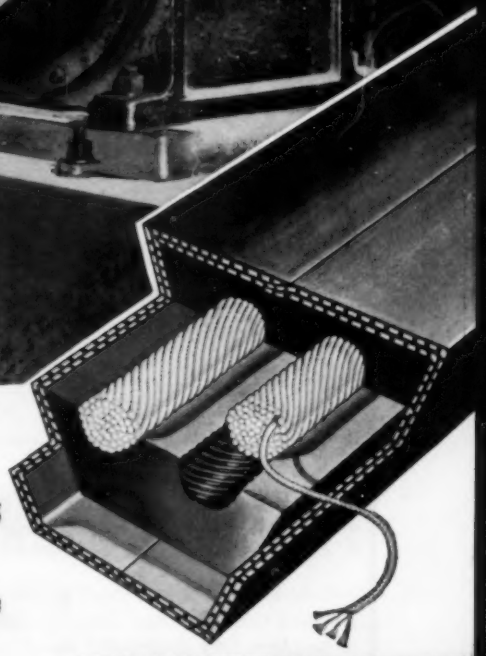

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. . . and Thermoid Hose for every job.

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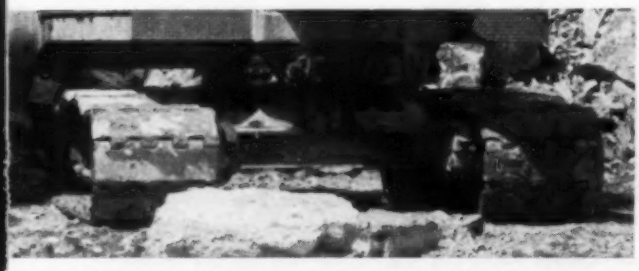
HOW AMERICAN CUT SHOE REPLACEMENT

Quarry operations really test a crane's crawler design. Yet, owners of American 300 Series Shovels and Cranes report years of tough operation without a single crawler shoe replacement! Here's why: American shoes, cast from special alloy steel, have heavy duty, double walled desig n. Four interlocking lugs distribute pin wearing forces over the whole track pin virtually eliminating the possibility of bending or breaking the pin.



EIGHT INTERLOCKING SHOE LUGS plus floating track pins reduce track wear and expense. The floating pins wear evenly, longer, because they're free to turn.

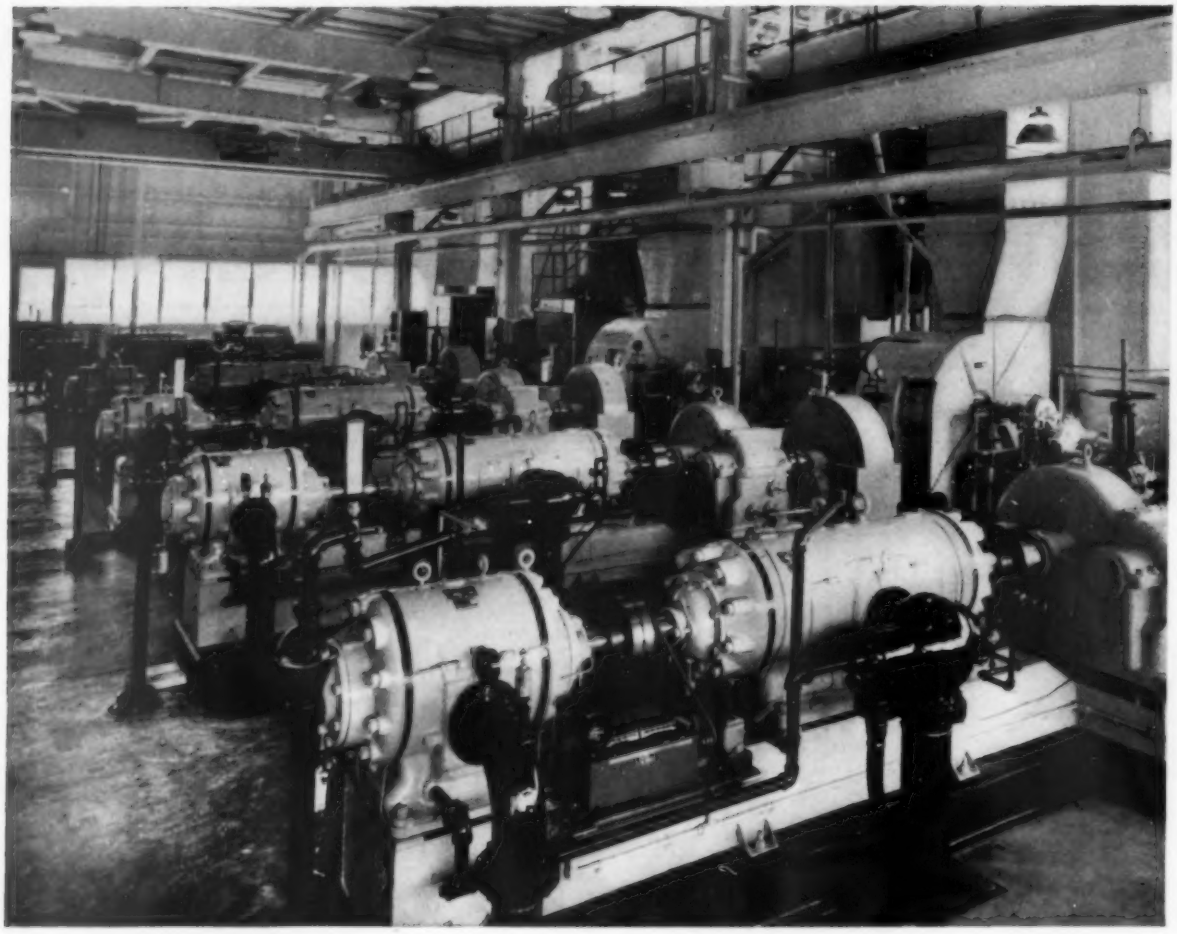
All rock for the 600 ton per day limestone production of the O'Fallon Quarry and Supply Company, located west of St. Louis, Mo., is easily supplied by one American 300 Series Shovel, shown above. The American actually prescreens the rock because any pieces too large for the bucket are too big for the crusher.

American 300 Series Shovels prove their outstanding durability in quarries across the country. Ask American owners about the performance of their machines—then check with your distributor for complete data on the American line in sizes from ½-yard up.

AMERICAN HOIST

and Derrick Company

St. Paul 7, Minnesota



4 YEARS - - 25,000 HOURS OPERATING PERFORMANCE!

This is just one of many production records set by Fuller Rotary Compressors—in this case by each of six machines installed in a leading aircraft plant. The only maintenance or replacement necessary over this period was installation of high and low pressure blades. Bearings held up 100%.

Fuller rotary compressors shown are four C-300-300H, steam turbine drive, capacity each 1248 to 1805 c.f.m., with speed ranges of 450 to 650 r.p.m., 125-lb. gauge pressure, and two electric motor drive, capacity each 1663 c.f.m., at 600 r.p.m., 110 lb. gauge pressure.

Your plant, too, can take advantage of the many cost-saving advantages of Fuller rotary compressors; such as smooth airflow, lack of vibration minimum of moving parts, adaptability to any production setup, and the advantage of "one man" operation.

Write today to Fuller Company and get complete data on how Fuller rotary compressors can give you more air power at less cost.

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FULLER COMPANY C-312 4659

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PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

THE INDEX TO THIS VOLUME HAS BEEN REMOVED FROM THIS POSITION AND PLACED AT THE BEGINNING OF THE FILM FOR THE CONVENIENCE OF THE READER.

liver sand and road-base material in sizes of 1 inch and minus $\frac{3}{4}$ inch.

The plant is powered by a 62.5 kva generator, driven by a diesel engine. The individual motors operate the conveyors and the scalping screen through short-coupled V-belts—there are no idlers, clutches, etc., to cause mechanical loss. The crushing plant itself is direct-diesel-driven by a propeller shaft. A single convenient push button station controls the entire closed-circuit system.

3. *Inclined positive-throw-type vibrating screen.*
4. *All moving screen parts operate in rubber bushings that need no lubrication.*
5. *Dual rear wheels for added stability; fully enclosed brakes on rear tandem.*
6. *Oversize self-aligning spherical bearings in crusher.*
7. *Heat treated chrome vanadium steel shaft in crusher.*

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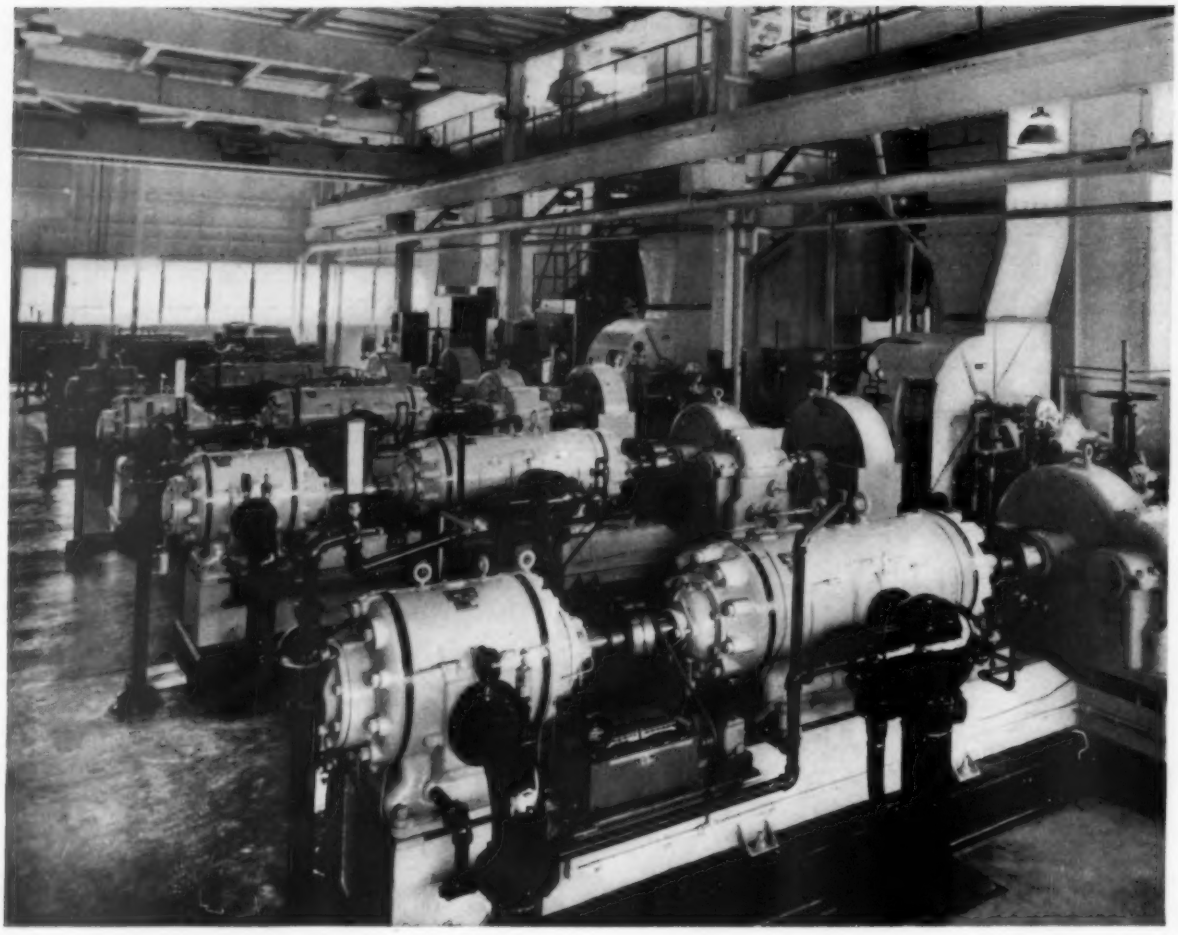

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Your plant, too, can take advantage of the many cost-saving advantages of Fuller rotary compressors; such as smooth airflow, lack of vibration minimum of moving parts, adaptability to any production setup, and the advantage of "one man" operation.

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PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

Portable A-W plant producing base material for large state highway job near Los Banos, California.

AUSTIN-WESTERN Crushing Plant produces rock at low cost for Richards-Underdown Co., Fresno, Cal.

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The plant is powered by a 62.5 kva generator, driven by a diesel engine. The individual motors operate the conveyors and the scalping screen through short-coupled V-belts—there are no idlers, clutches, etc., to cause mechanical loss. The crushing plant itself is direct-diesel-driven by a propeller shaft. A single convenient push button station controls the entire closed-circuit system.

There's a high-speed, profit-making Austin-Western Plant exactly right for your needs. Call on your nearest distributor for full information. Or write Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Lima, Ohio.

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1. *Welded steel plate frame for high strength without weight of cast steel frame.*
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3. *Inclined positive-throw-type vibrating screen.*
4. *All moving screen parts operate in rubber bushings that need no lubrication.*
5. *Dual rear wheels for added stability; fully enclosed brakes on rear tandem.*
6. *Oversize self-aligning spherical bearings in crusher.*
7. *Heat treated chrome vanadium steel shaft in crusher.*

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BALDWIN BLH LIMA-HAMILTON

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B. F. Goodrich improvements in rubber brought extra savings

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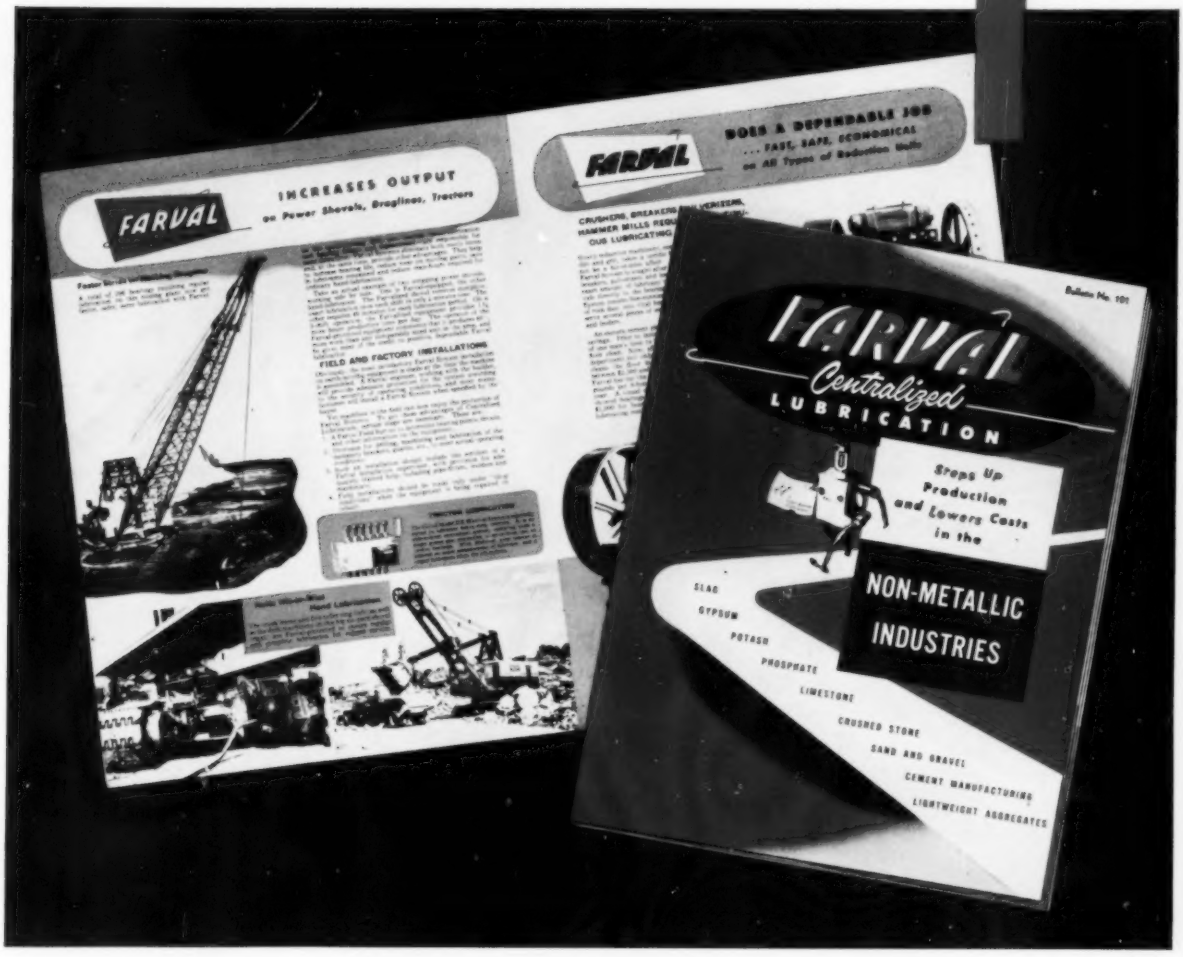
INDUSTRIAL PRODUCTS

Here's how centralized lubrication savings soon pay for a Farval system

FARVAL—
Studies in Centralized Lubrication
No. 200



● Interested in a system that produces savings to pay for itself in a few months? And protects your investment in expensive equipment for ten, twenty, or even thirty years or more?

If so, you'll want this new Farval Bulletin 101. It illustrates and describes the application of Farval Centralized Lubrication Systems to a dozen types of equipment—draglines, shovels, crushers, mills, cranes, conveyors and other machinery used in the non-metallic producing and processing industries.

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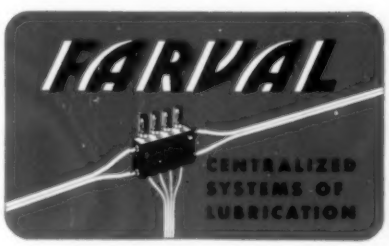

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